BEVEL-EDGE CHISELS See which ones outperform the competition *Page 76*

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ISSUE 116 AUGUST 1999

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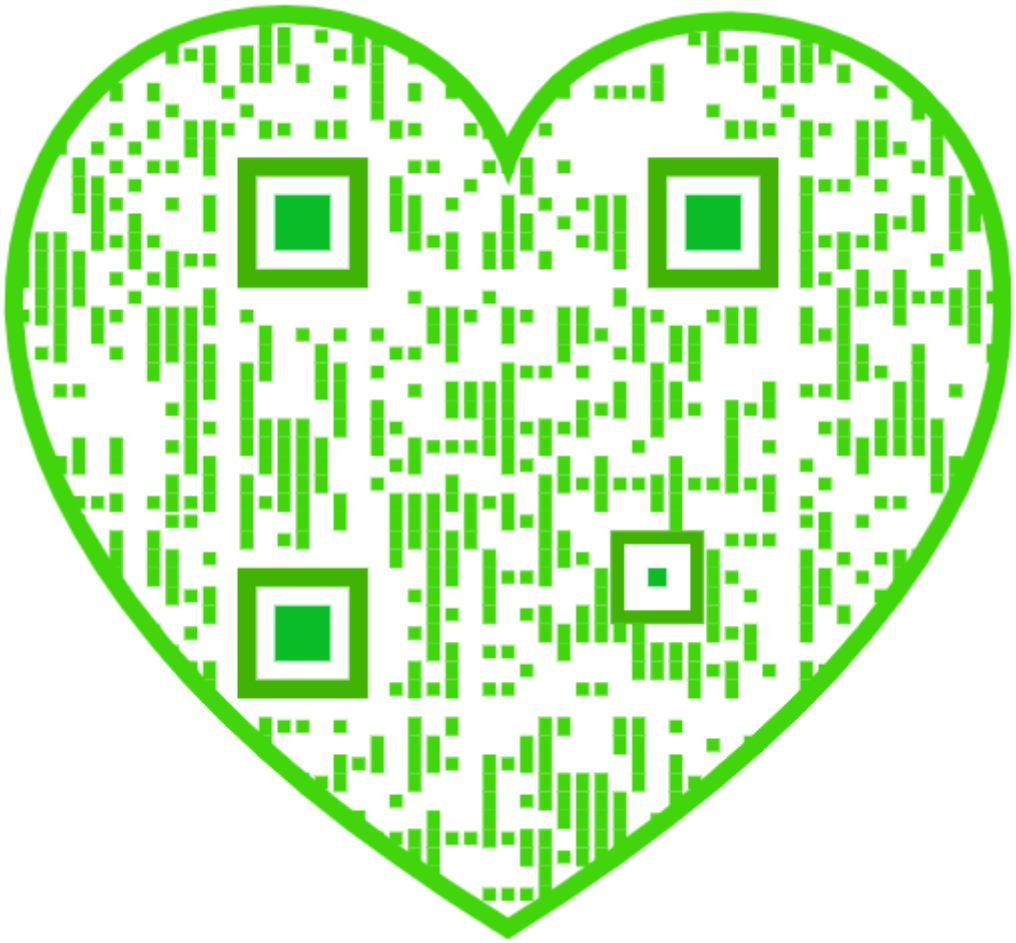

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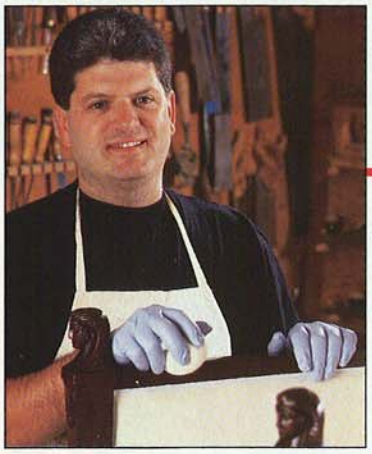

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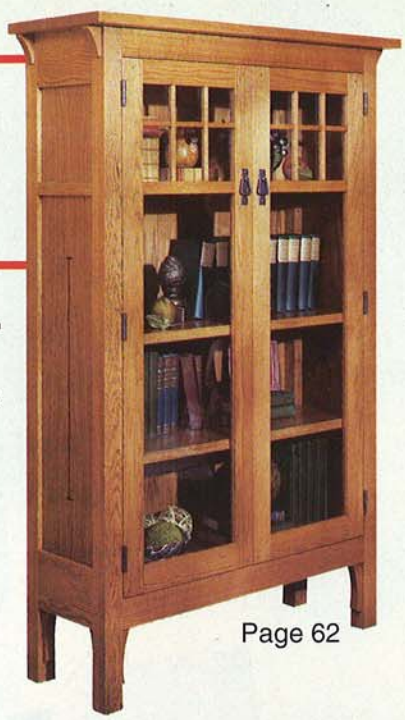

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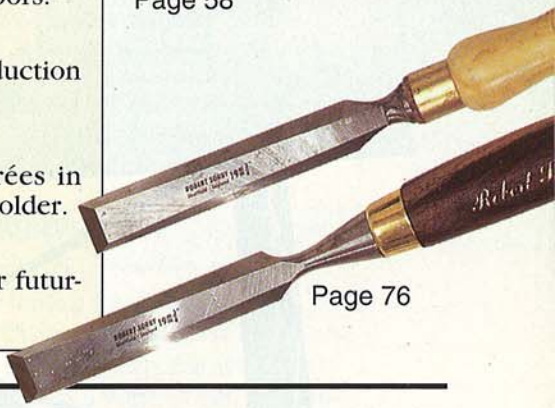

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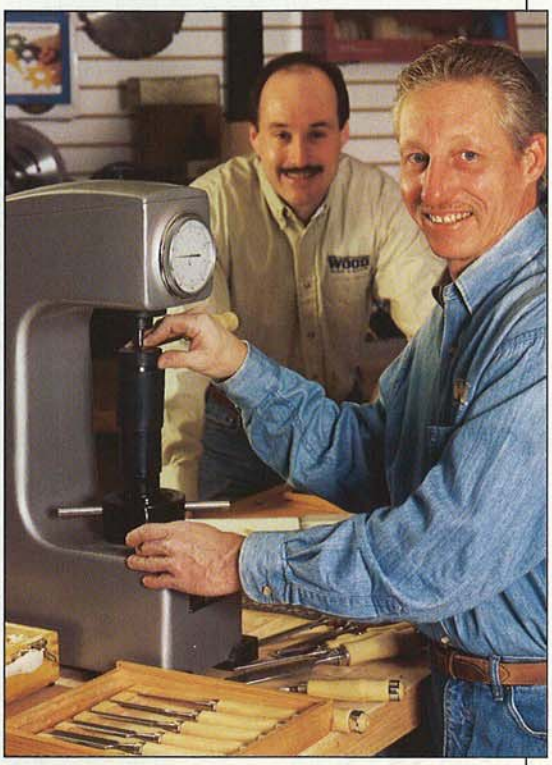
When asked their opinion, readers of *WOOD*® magazine almost always give high marks to our tool-testing articles. Most everyone likes the fact that we personally take a close look at each tool covered in a given article and put it through its paces before rendering our opinion. In addition, they appreciate hearing about the good and not-so-good features and the performance of the various tools.

We also like to think we have the most complete tool-comparison charts in the woodworking-publication field. It's not uncommon, for example, for us to include no-bones-about-it grades in six or seven performance categories, in addition to all the other helpful data accompanying each tool. Suffice it to say, we approach these articles with the resolve to supply you with the very best and up-to-date recommendations. That way, you can make an informed decision if you're in the tool-buying mood.



Bill Krier (in back), our senior resident tool authority, and Bob McFarlin, independent tool-tester extraordinaire, testing the hardness of a chisel with our newest piece of equipment.

For this issue's article on chisel sets, Bob McFarlin, one of our independent product testers, and Bill Krier, our senior staff tool authority, approached me with a suggestion. They thought this might be just the right time to spend the money to purchase a hardness testing device. And, as it turns out, they were right.

In the course of their investigation of 24 sets of bevel-edge chisels, they found out that there are large differences between the various brands. And, on occasion, the steel hardness differs from chisel to chisel in the same set. I invite you to read the chisel article on *page 76*. It's the first time we've ever taken a good hard look at this tool category. If you're like me, you'll learn a lot from reading the piece.

By the way, if you have thoughts or suggestions about our testing procedures or suggestions on which tool categories you would like to see us take a look at, here's how to make your wishes known. Just write to Bill Krier at *WOOD* magazine, 1716 Locust Street, GA310, Des Moines, IA, 50309-3023. He'll be happy to get your input.

Larry Clayton

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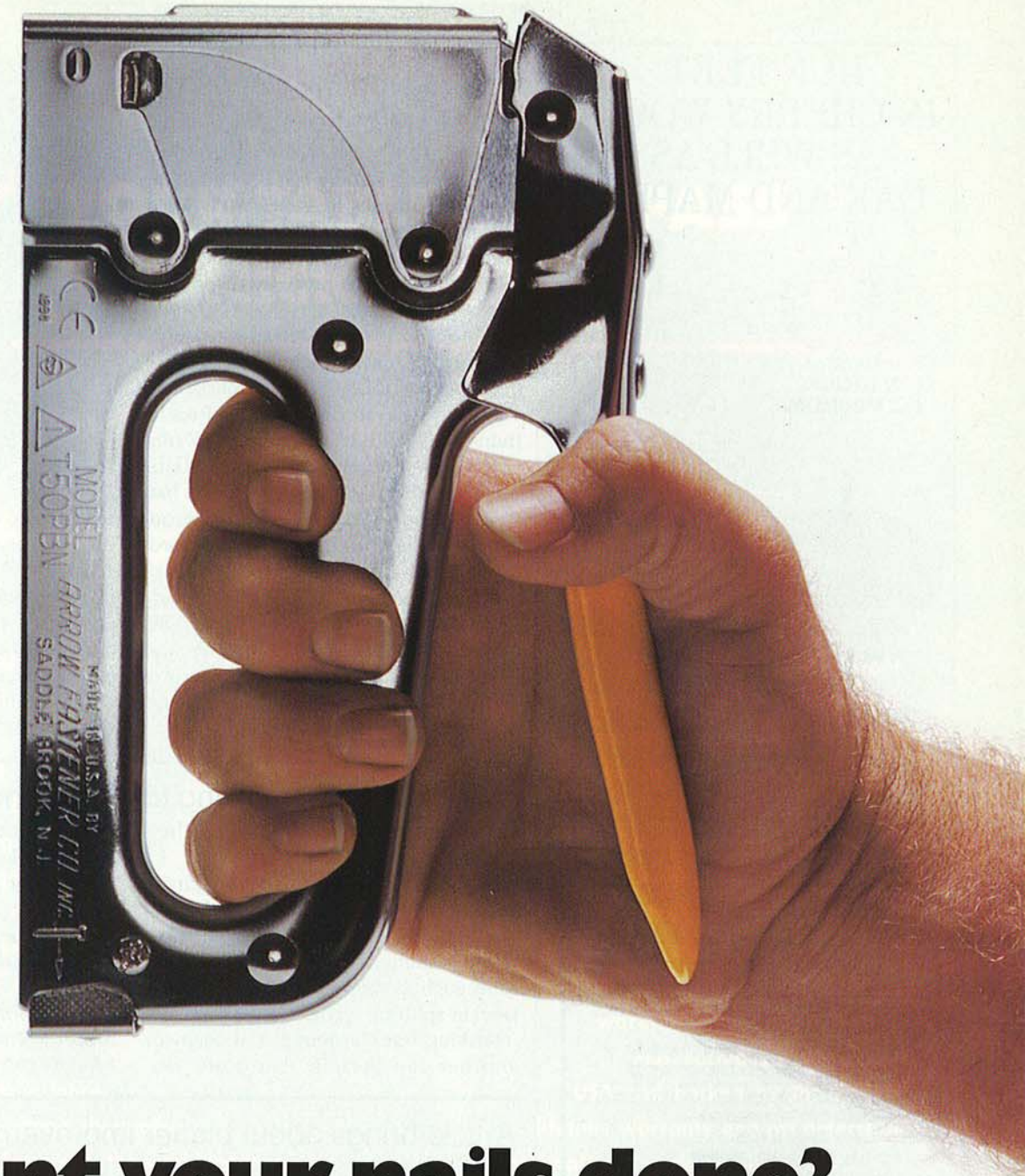

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TALKING BACK

How to properly dispose of Ni-Cad batteries

We printed some information on charging and storing Nickel-Cadmium (Ni-Cad) batteries in issue #105. We'd like to add to that article, while also doing our part for the environment, by telling you how to properly dispose of dead rechargeables.

A nonprofit organization known as the Rechargeable Battery Recycling Corporation (RBRC) was established in 1994 by the Rechargeable Power Industry. The RBRC was created to educate the public about the benefits of recycling the Ni-Cad rechargeable batteries found in many consumer products, such as cellular phones and cordless power tools.

When you throw away Ni-Cad's, they contribute to toxicity levels in landfills or incinerator ash. To prevent this, the RBRC has a *Charge Up to Recycle* program that helps establish drop-off locations for your used Ni-Cad's.

To locate the drop-off location nearest you, or to set up a business that can help in the *Charge Up to Recycle* program, call 800/8-BATTERY, or log on to: *www.rbrc.com*

You also can obtain tips on recharging batteries for extended life, as well as information on local recycling laws, through the RBRC.

Never strike two striking tools together

I enjoyed the article "Wood by the Yard" in issue #113. However, I would like to caution readers regarding the photo on page 68 that shows the striking of an ax head with a sledge hammer. The metal in striking tools such as these is harder than the steel in splitting wedges.

Striking one hardened tool against another can literally cause one or both to send sharp metal fragments flying at high velocity. So, always use wedges for splitting wood, and don't forget to periodically file off the mushroomed part of the wedge.

—Mike Berry, Trinidad, Calif.

Editor's note: Our sincere thanks to Mike and to the other readers who brought this oversight to our attention.

Article brings about planer improvements

I just received issue #115 with the article on stationary planers. I want to thank you for doing an objective and practical review.

Based on your article we are doing the following: 1.) All future shipments of our planers will have jackscrews for adjusting knives instead of springs. 2.) We will be introducing a new 15" planer, the G1021Z, that will be similar to the Jet JWP-15CSW and Powermatic 15, with a 3-hp motor, one-piece stand, rollers on top, and jackscrew knife setting. It will be made in the same factory as the Jet and Powermatic models.

The great thing is that ours will sell for around $900. We can sell it at this price because there is no dealer network between us and the customer.

—S. Balolia, president, Grizzly Industrial, Bellingham, Wash.

We would like to hear from you

We welcome your comments, criticisms, suggestions, and yes, even compliments. We'll publish letters of the greatest benefit to our readers. Write to: Talking Back, *WOOD* Magazine, 1716 Locust St., GA310, Des Moines, IA 50309-3023.

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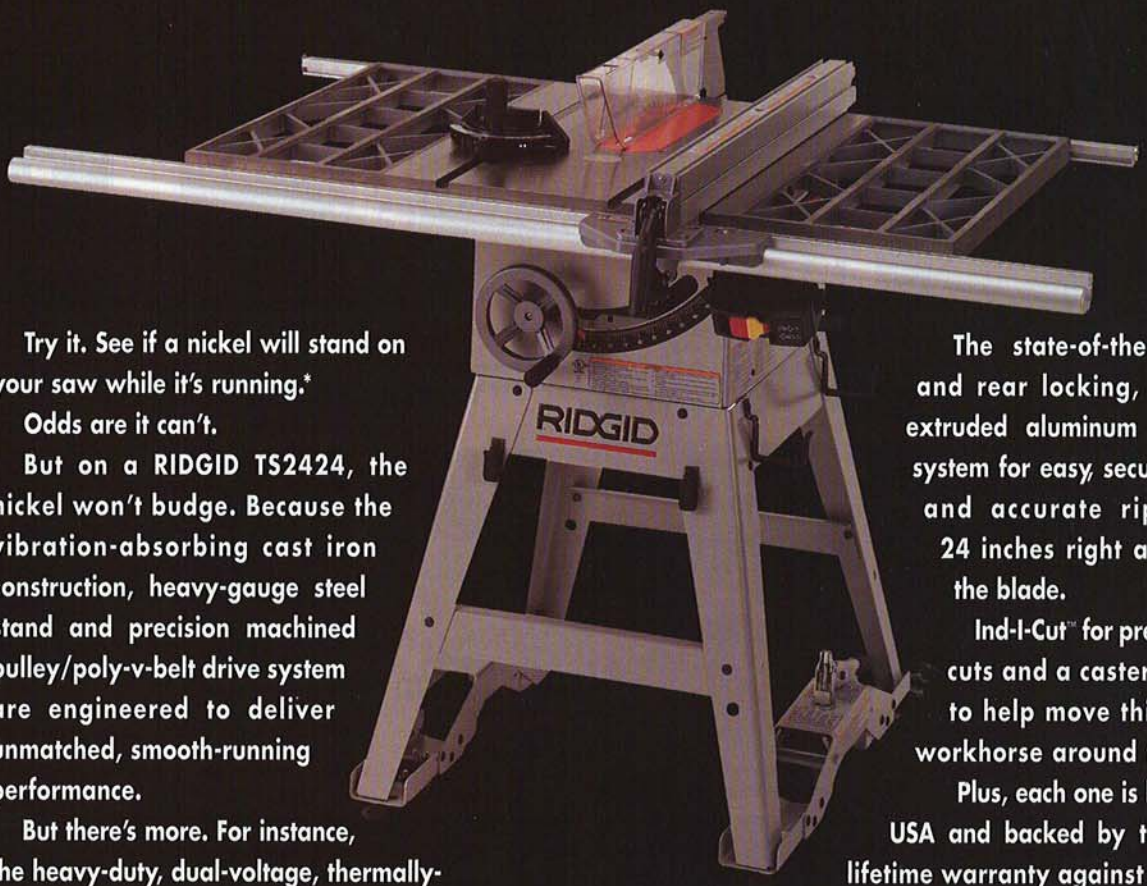

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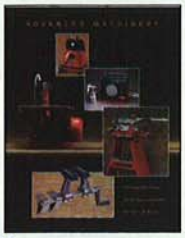

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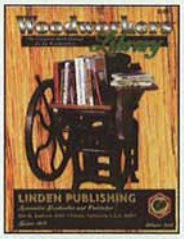

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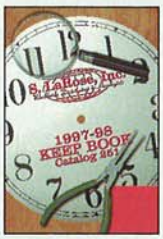

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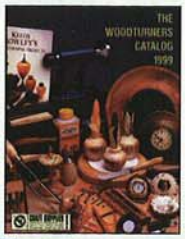

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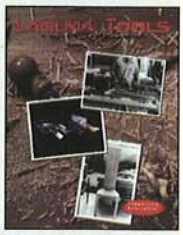

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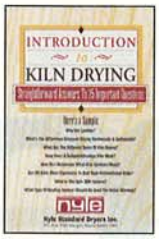

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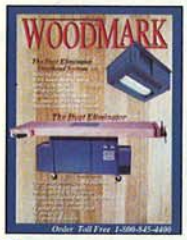

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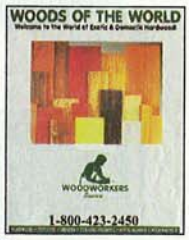

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We've got the roomiest compact Club Cab out there. And it's filled with conveniences like a mini-business console with a hidden storage compartment.

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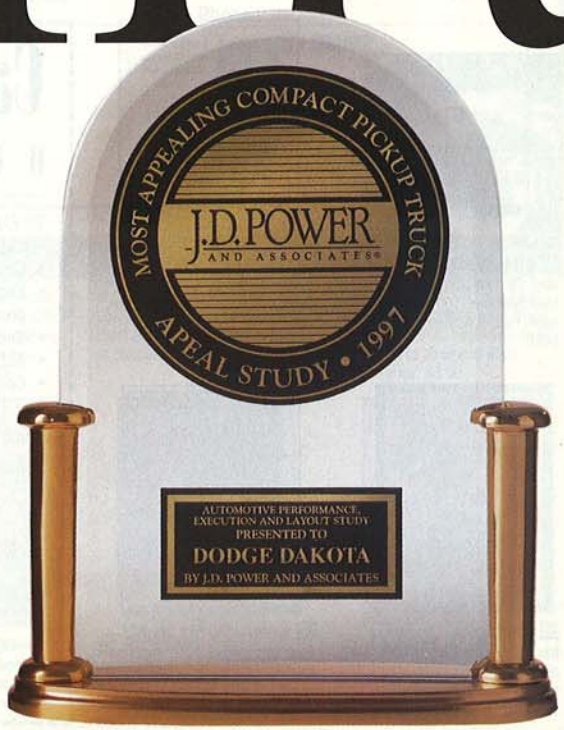
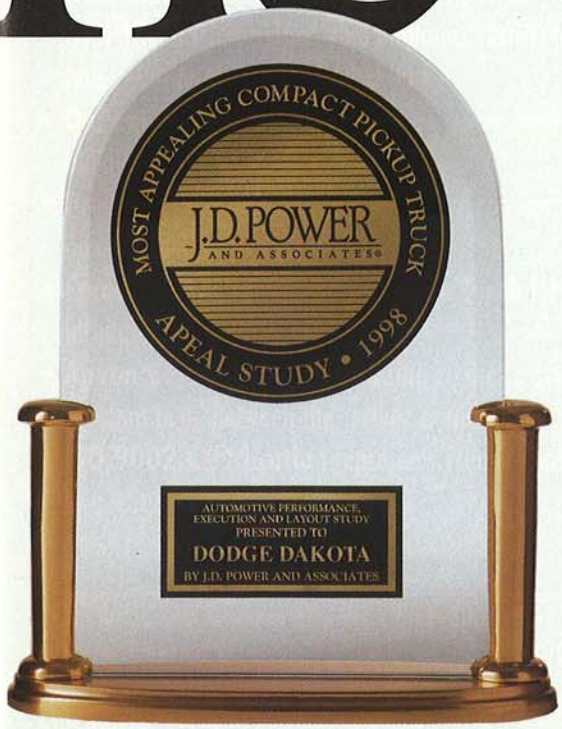


arates rucks he toys.

That unmistakable Dodge truck grille tells you everything you need to know about the genetic material that defines Dakota's capabilities.



For the second year in a row, J.D. Power and Associates has ranked Dodge Dakota "Most Appealing Compact Pickup Truck," based on responses from the people in the best position to know: Dodge Dakota owners. It's a prestigious award and, to us, one that seems to pretty clearly separate the roomy, comfortable Dodge Dakota from its more diminutive brethren in the class. And it's just as clear that Dakota is heading down the same proud career path as its older brother Ram, which has received the "Most Appealing Full-Size Pickup" award four years in a row. Dakota. It's full of surprises. And trophies.*

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*J.D. Power and Associates 1995-1998 Automotive Performance, Execution, and Layout (APEAL) Studies.SM 1998 study based on 97,907 consumer responses. www.jdpower.com

Always use seat belts. Remember a backseat is the safest place for children.

EASY-DOES-IT

Sheet Goods Mover/Lifter

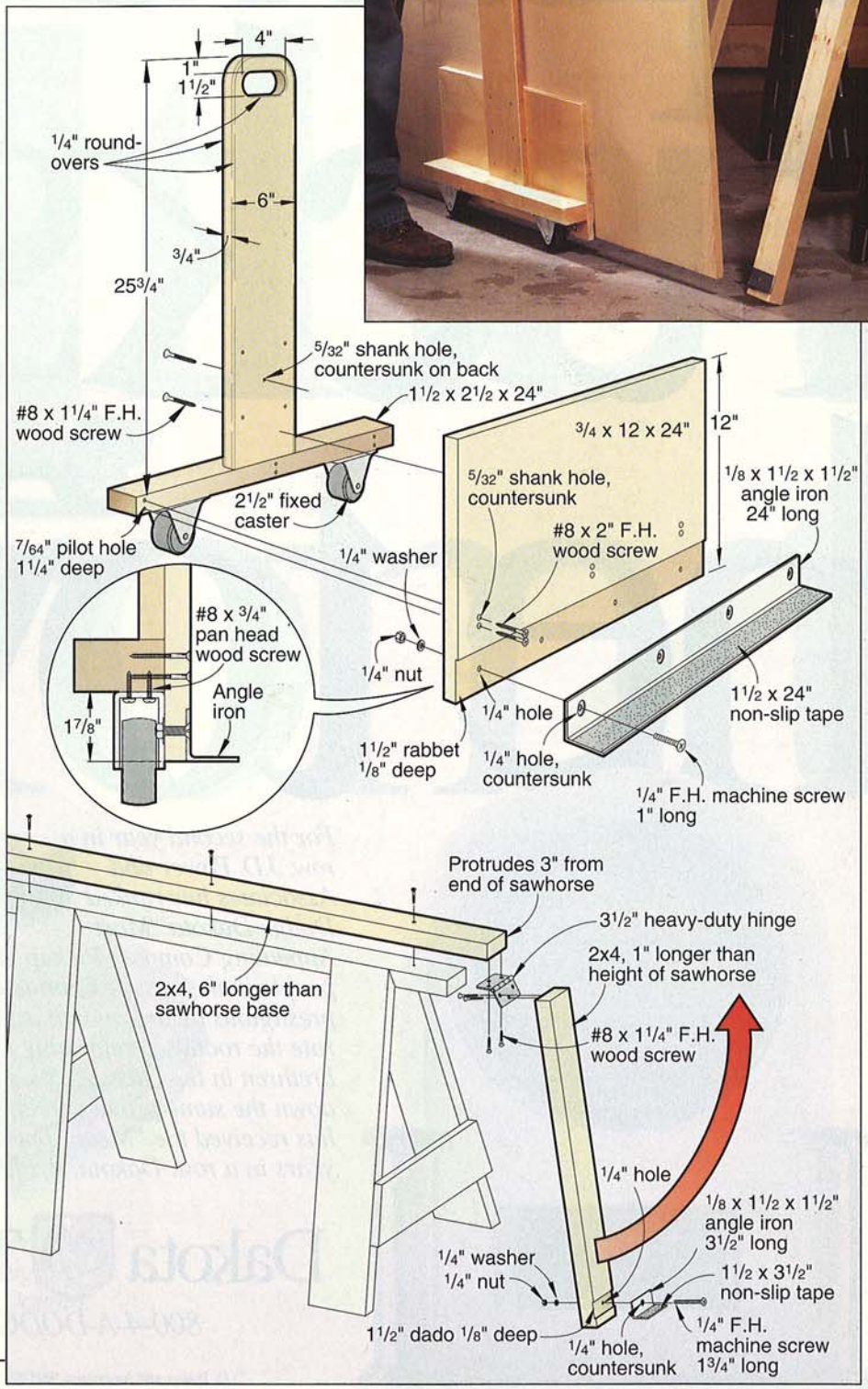
Few shop chores rival the awkwardness of moving large sheet goods by yourself. And it's nigh on impossible to get them up on sawhorses without help (or the horses skittering across the floor). You'll never again have to cajole reluctant family members into helping if you use this system, designed by *WOOD*® magazine reader Jim Forney.

Build the dolly from ¾" plywood or medium-density fiberboard (MDF), and solid stock, as shown in the drawings at *right*. Carefully position the casters so they run parallel to one another—otherwise, the dolly can shimmy like a bad shopping cart.

Each sheet lifter consists of a pair of hinged 2×4's. One attaches temporarily to the top of your sawhorse; the other guides the stock from vertical to horizontal.

To work the system, slide the angle-iron of the dolly under the edge of the sheet you want to move (it works best if you store your sheet goods standing on their long edge, raised up on 2× stickers). Grab the top of the sheet and tip it toward you. This lifts the material off the stickers and shifts its weight to the dolly. Now wheel the sheet to your work area, steering it by tilting and pivoting the dolly on one caster.

To lay the sheet on sawhorses, roll it into position over the angle iron of the lifters, and tip the sheet toward the sawhorses to free the dolly (the sheet should be resting only on the lifters). Pull the dolly away and set it aside. Now, raise the material by tilting the top toward the sawhorses—the lifters will drop down to the floor once the weight of the sheet has transferred to the horses.



Project Design: Jim Forney, Bricktown, N.J.
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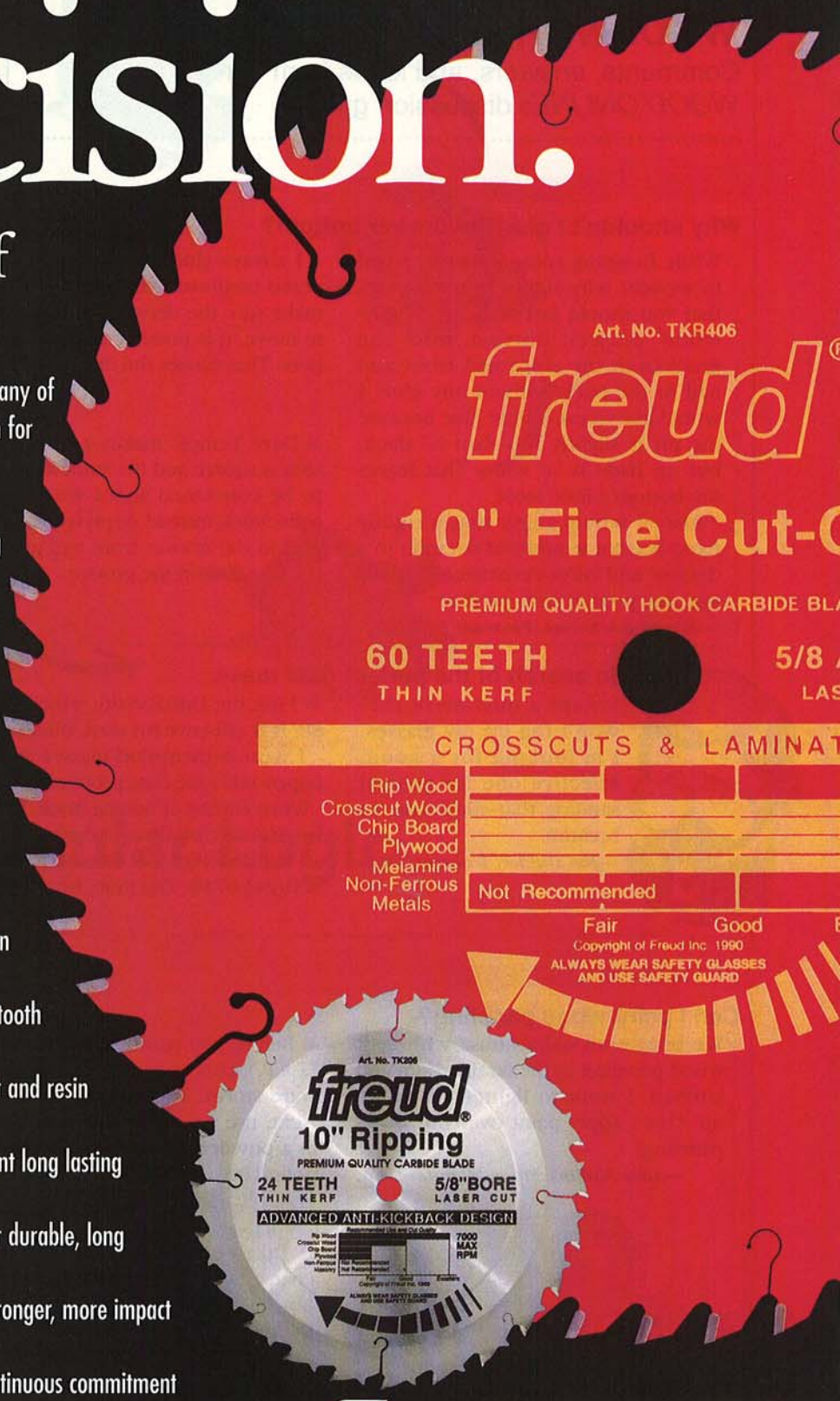

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WOODWORKERS TO THE RESCUE

Comments, answers, and ideas from our *WOOD ONLINE*® discussion groups

Note: If you would like more information on the woodworking-related subjects featured here, visit our *WOOD ONLINE* discussion groups at www.woodmagazine.com We have edited all entries in the interest of brevity and clarity while preserving the message. Opinions expressed here are those of our online participants, as well as *WOOD* magazine.

GENERAL WOODWORKING

Why shouldn't I glue the drawer bottom?

While finishing some drawers, I had to wonder why almost everyone says that you should just slide the ¼" plywood drawer bottom into the grooves in the sides and front and nail to the back without any glue. I would like to use a little glue because the ply is slightly less than ¼" thick, but my dado is ¼" wide. That leaves the bottom a little loose.

Also, I would think that a rigidly fixed bottom would add strength to a drawer and offer resistance to racking. Any pros or cons on this?

—Myron Backhaus, Pleasant Hill, Calif.

● I always glue my drawer bottoms, which I normally make out of ¼" tempered hardboard or plywood. Once you glue the drawer bottom in place and make sure the drawer is square, it will stay that way. If the bottom is allowed to move, it is possible to rack the drawer and break the glue bonds at the corners. That causes the drawer to get out of square.

—Dave Temple, Waukesha, Wis.

● Dave Temple makes a good point. You always should ensure that the bottom is square and fits somewhat snugly before gluing. The only time you need to be concerned about wood movement is when the bottom is made from solid stock instead of plywood or hardboard. In these cases, run the grain parallel to the drawer front and glue the front end of the bottom in place, letting the rest float in the groove.

—WOOD *magazine*

In search of the perfect dust mask

I want a dust mask that won't fog up my glasses. I'm looking for a good, effective one for general sanding that allows me to breathe.

—Jim Ditzler, Wooster, Ohio

● I use the DustFoe 66, which I understand has been replaced by the DustFoe 88. It is effective for dust, but not fumes.

I wear prescription glasses and this mask does not fog up. I am also really happy with the dust protection it provides with replaceable filters.

When cutting or milling stock, I cannot even smell the wood—only a minor problem if you enjoy the wonderful smell of fresh-cut stock. Be good to your lungs.

[The DustFoe 88 can be purchased mail-order from Highland Hardware, 800/241-6748. The item, no. DF88, costs $29.95, plus $5.95 for shipping.]

—John Rauch, Mt. Airy, Md.

HOME IMPROVEMENTS

Can I paint wood paneling?

We bought an older house with dark wood paneling in the family room and kitchen. I want to lighten the room up. Can I apply paint over the wood paneling?

—Alice Mullins, Stone Mountain, Ga.

● Before you paint, wash the paneling thoroughly with trisodium phosphate (T.S.P.). Lots of places sell this product—home centers, paint stores, and hardware stores. T.S.P. removes airborne grease that tends to stick to paneling. Next, use a good primer and then paint in the normal fashion. [T.S.P. comes in a powder form and mixes with water. You can purchase it in one- or five-pound boxes, the latter costing under $7.]

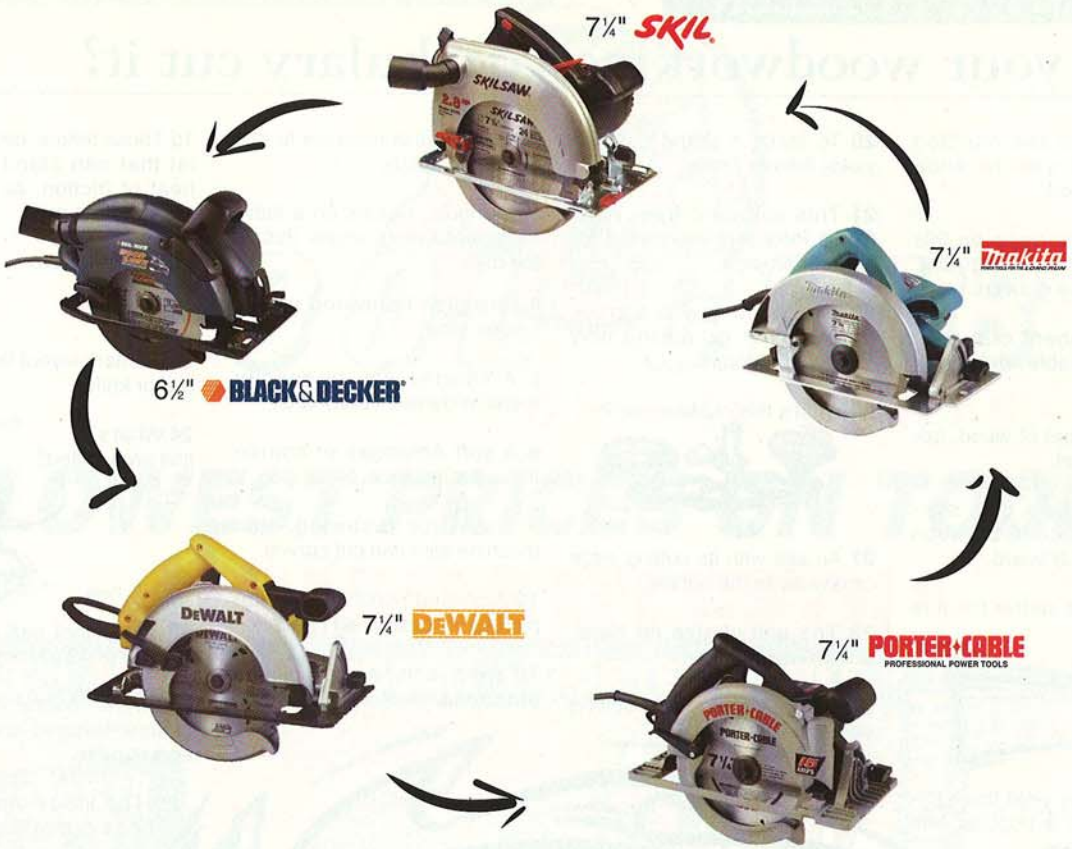
—Steve Walls, Littleton, Colo.

● Take spackling compound and fill any grooves or holes. Let dry. With coarse 80- or 100-grit sandpaper, roughen the surface of the whole area and put on a good oil-based paint primer. (I normally apply two coats.) Let dry, then paint or cover with wallpaper.

—Raymond Holsopple, Somerset, Pa.

● Wood filler actually works better than spackling and lasts much longer. To prepare the surface of glossy paneling, you need to first wash it, then either sand it with 120- to 220-grit sandpaper or wipe it down with a deglosser, found at paint stores, home centers and hardware stores. Finally, apply an oil-based or latex primer and follow with two top coats.

—Jed McDermett, Sherwin Williams paint store, Des Moines, Iowa



Circular Logic

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Does your woodworking vocabulary cut it?

Across

3 You pull this two-handled knife toward you to slice through the wood.

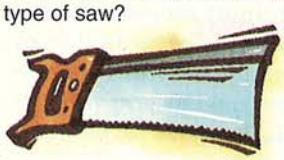
7 Pins and tails make up this traditional woodworking joint, often favored for drawers.

8 The component of a tool, usually removable, that does the cutting.

11 128 cubic feet of wood, frequently firewood.

12 This could be a thick shingle or a separation between growth rings in a board.

14 What's the name for this type of saw?



16 Linden trees yield this light-colored wood, a popular one with woodcarvers.

17 A common woodshop hazard for your fingers.

19 A pointed tool for scribing layout marks.

20 To make a sizing cut that yields thinner stock.

21 This softwood from West Coast forests is well suited for outdoor projects.

23 This wood flaw is a crack that doesn't go all the way through the board.

26 What's this old-time tool?

27 An axe with its cutting edge crosswise to the handle.

28 The unit of size for nails, abbreviated as *d*.

30 A stationary tool for forming edge profiles.

Down

1 Count on this machine to drill holes accurately.

2 To mount a blank on a lathe for bowl turning, screw this to the back.

4 Hawaiian hardwood with a golden glow.

5 A shorter way to specify medium-density fiberboard.

6 A soft Arkansas or coarse India, for instance.

9 Great for resawing, this machine also can cut curves.

10 A pointed punch with a dimpled tip for hiding nail heads.

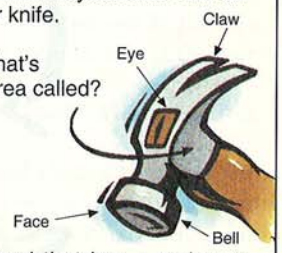
13 Axes, chisels, and planes are examples of _ _ _ _ tools.

15 These letters identify material that can stand up to the heat of friction, as in turning tools or twist drills.

18 This dimension.

22 To mark layout lines with an awl or knife.

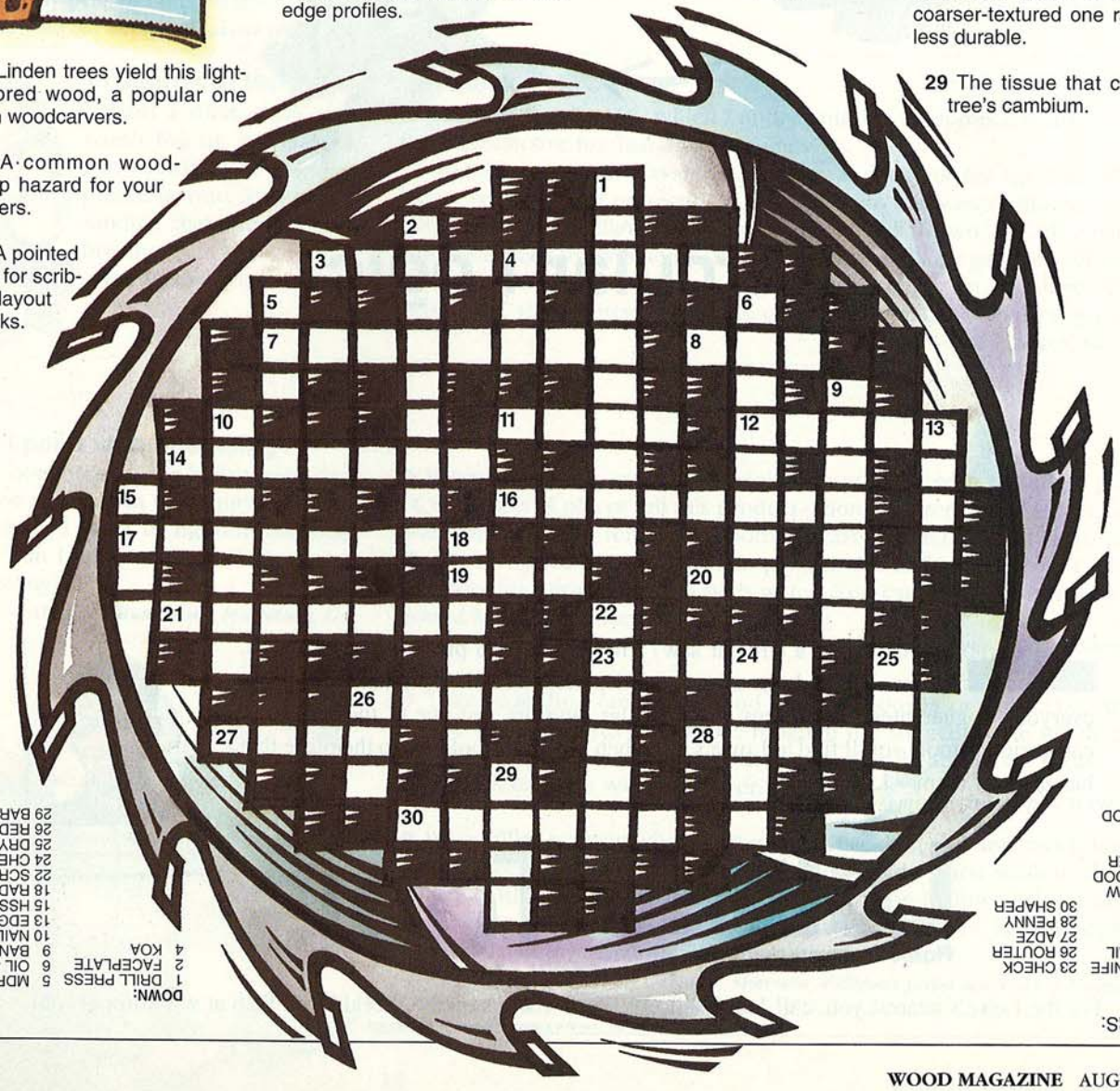
24 What's this area called?



25 Wood that has a moisture content of 19 percent or less.

26 Of the "colors" of oak, this coarser-textured one ranks as less durable.

29 The tissue that covers a tree's cambium.



ANSWERS:

ACROSS:
3 DRAWKNIFE
7 DOVETAIL
8 BIT
11 CORD
12 SHAKE
14 BACKSAW
16 BASSWOOD
17 SPLINTER
19 AWL
20 RESAW
21 REDWOOD
23 CHECK
26 ROUTER
27 ADZE
28 PENNY
30 SHAPER

DOWN:
1 DRILL PRESS
2 FACEPLATE
4 KOA
5 MDF
6 OIL STONE
9 BANDSAW
10 NAIL SET
13 EDGE
15 HSS
18 RADIUS
22 SCRIBE
24 CHEEK
25 DRY
26 RED
29 BARK

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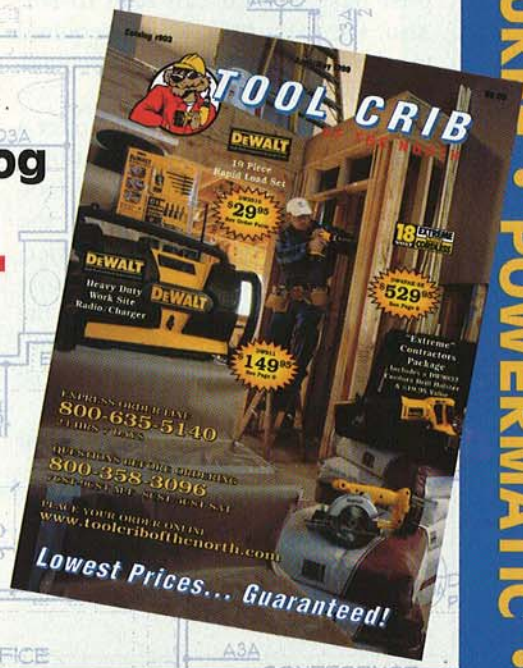

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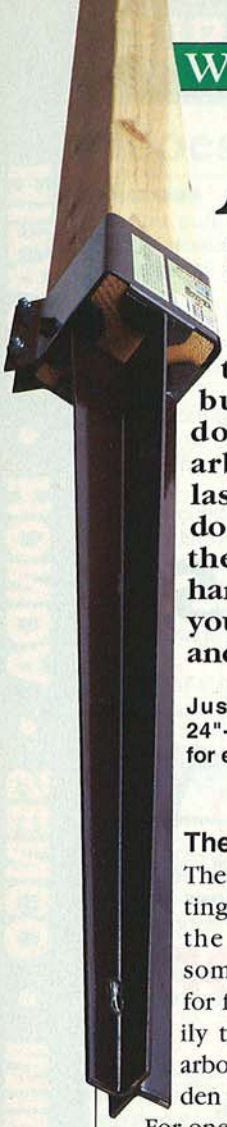
Anchor's The Way

Steel bases give your outdoor projects solid moorings

After investing your time and money in building a great outdoor project like the arbor on *page 52*, the last thing you want to do is watch it topple in the wind. Here's some hardware that will help you firmly anchor yard and garden projects.



Just pound this anchor's 24"-long spike into the ground for easy post-setting.

The steel solution

The old, reliable method for setting a post—dig a hole, stand the post in it, then pour in some concrete—may be fine for fences. But it's not necessarily the best way to anchor an arbor or some other yard or garden structure.

For one thing, the surface of the fill around the base of the post often comes out lower than ground level. This allows water to pool around the post base, which can lead to rot. Also, the extra bury length required for the posts usually makes prebuilding a structure impractical.

Steel post bases and anchors offer a simple, effective means of mating a 4×4 wooden post to a concrete footing. And one variety of anchor, the GroundTech post installation device, shown *above*, doesn't even require pouring concrete. You just drive the steel fixture into the ground, and tighten two bolts to clamp the post into its collar.

You'll find two kinds of bases for attaching posts to concrete footings—those that you can fasten to concrete that's already cured (shown at *right)* and the ones made to be embedded in wet concrete (shown *inset, far right*).

Bolt a base to cured concrete

For outdoor structures, bolt-down post bases like those shown *below* provide solid post mounting. They establish a standoff distance of about 1" between the bottom of the post and the concrete, which keeps the foot of the post above ground moisture and puddled water.

The base attaches to an existing concrete footing with a ½" anchor bolt 5" long, like the one shown. To install the bolt, drill a hole for it in the concrete; then cement it into the hole with mortar or an epoxy masonry adhesive, such as Simpson Epoxy-Tie. Set the bolt so that the end extends about ¾" above the surface.

After the mortar or epoxy cures, secure the base with a nut and washer. Then, position the post, and nail or screw it in place.

Put in a base when you pour

When you're pouring new concrete footings for a project, you can take your choice between the post bases designed to be embedded in the concrete or the bolt-down variety. Deciding which to use is largely a matter of preference or convenience.

Embedment bases, shown *below*, offer simplicity. After pouring the concrete, you just stick the base in place, level and align it, then let the concrete cure.

But beware: If you're anchoring a prebuilt project that has several posts, such as the arbor on *page 52*, putting one base even slightly out of alignment can cause untold woe.

For projects like these, you'll do better using the bolt-down anchors. To

Continued on page 20

Embedded bases like these go into the concrete as you pour your footing. Outside, use the one in the foreground, which provides 1" moisture-protection standoff when installed. The base behind it sits flush with the surface; so it's best suited to use in dry, sheltered places.

Attach a post to existing concrete with a bolt-down base. For new work, embed an anchor bolt for the base in the concrete when you pour. You can nail these bases to wood, too. Both provide 1" standoff height for weather exposure.

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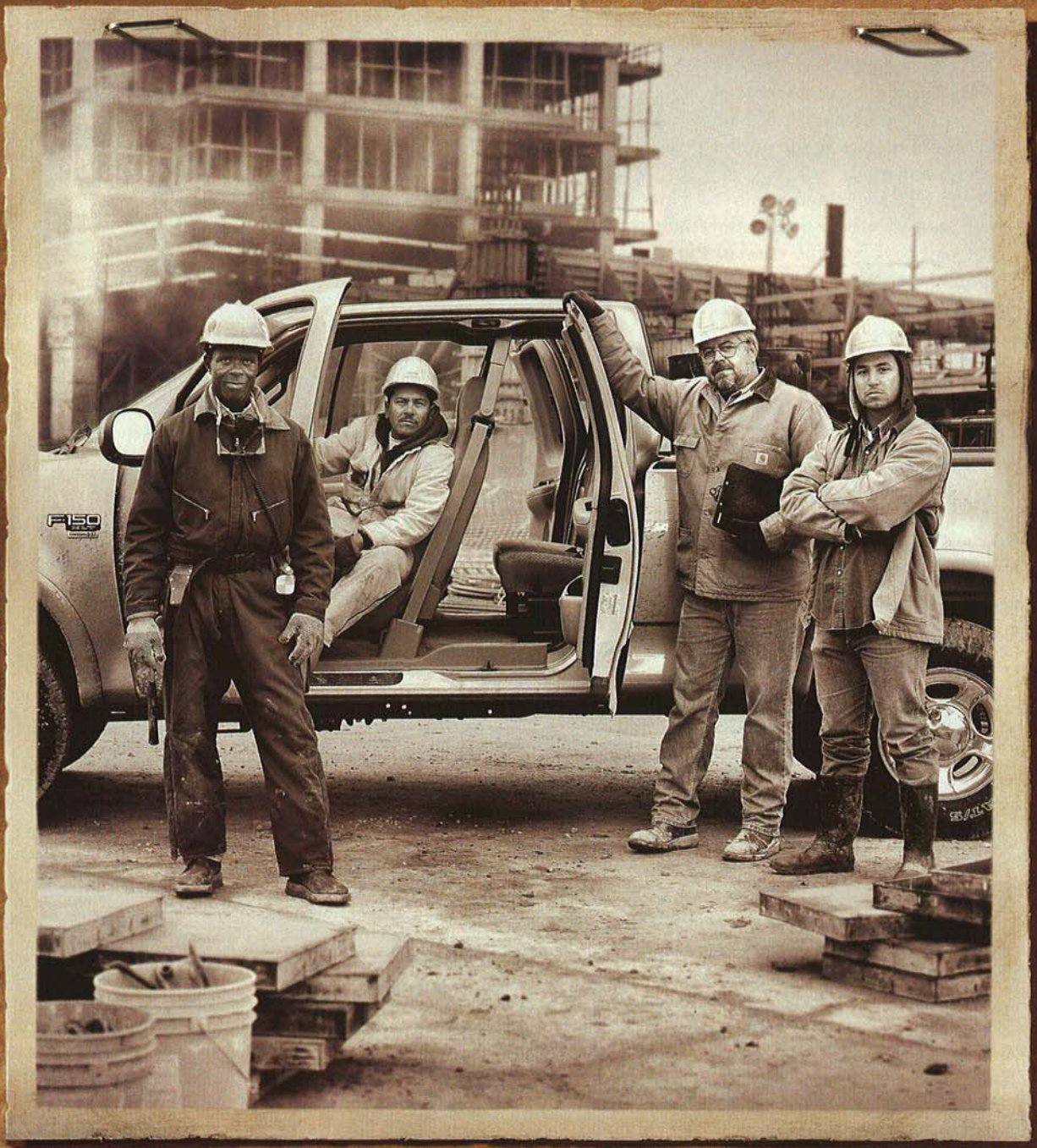

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Continued from page 18

Anchor's The Way

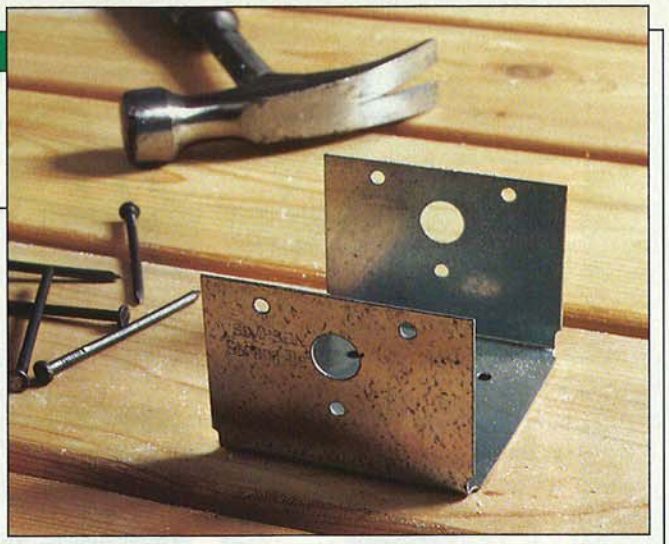
save the effort of drilling a hole in the footing, though, embed the bolt in the concrete when you pour it. Set the bolt in the center of each post location; post base designs allow some leeway for proper positioning when you bolt them down.

You also can take advantage of steel anchors when joining posts to another wooden structure, such as a deck or porch. Just nail or screw the base to the mounting surface. A simple, U-shaped base like the one *right* will suffice in situations where no moisture-protection standoff is necessary.

Advice on using anchors

When building and anchoring a structure, keep these points in mind:

- Check local building codes for particular requirements or limitations.
- The post bases shown are recommended for anchoring posts that have a supporting top structure. (The arbor on *page 52* is an example of a top-supported structure.)
- Always use the number and size of fasteners specified for the base.



A plain U-shape base doesn't raise the bottom of the post above ground level, so water could puddle around it. Avoid using this style for outdoor projects.

- Don't substitute drywall screws for nails; use screws of the type and size specified by the base manufacturer.
- Outdoors or where water may splash onto the foot of the post, install a base that stands the bottom of the post about 1" above the surface. This prevents water from puddling around the bottom of the post and wicking into the end grain.

Photographs: Hetherington Photography

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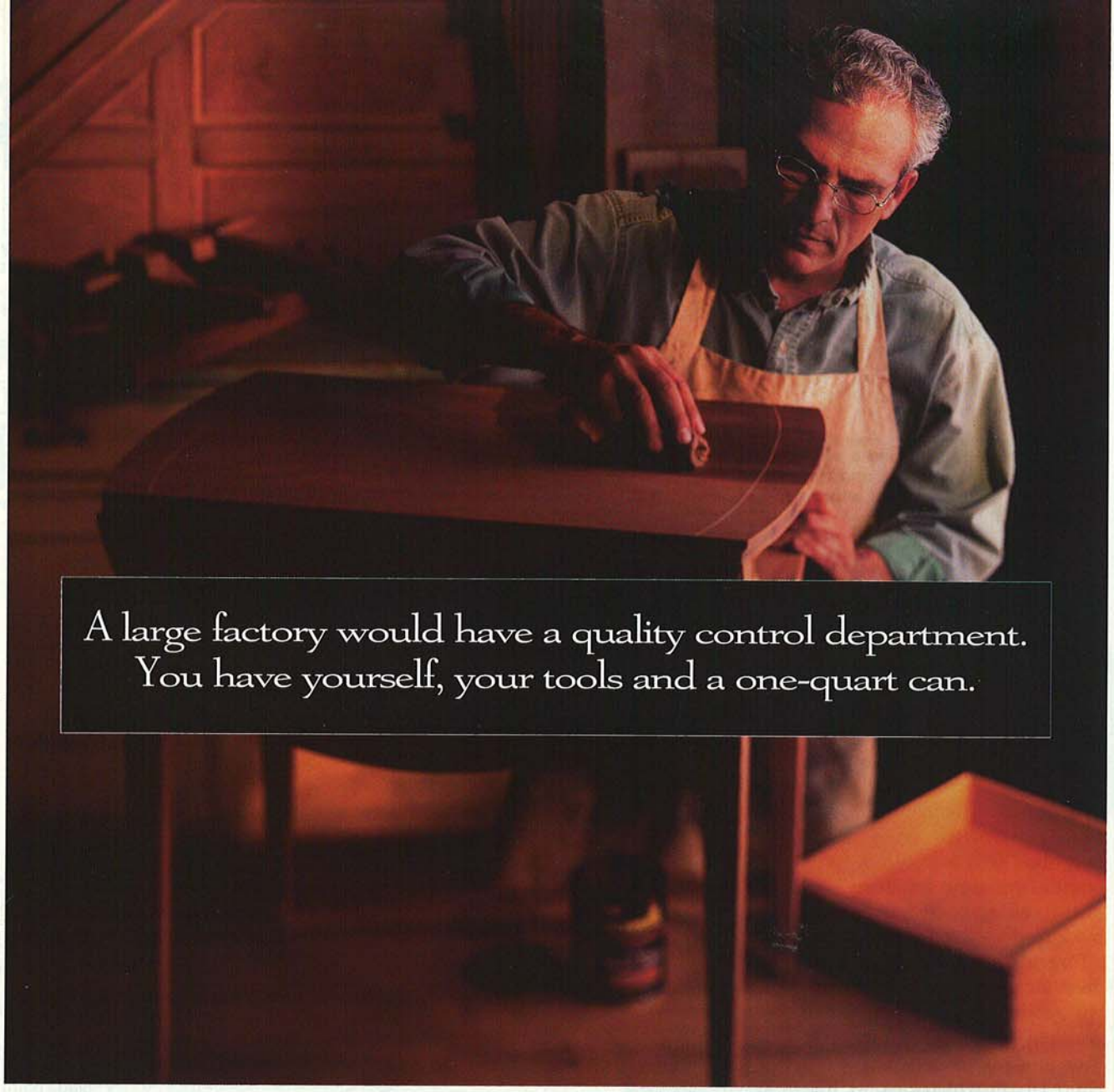

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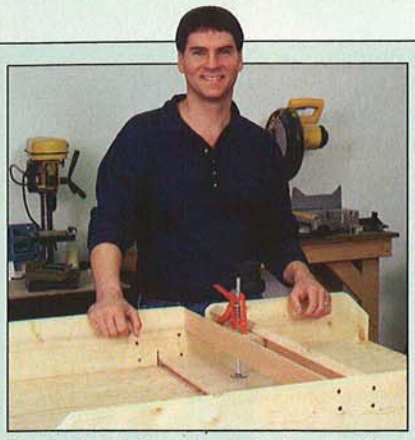

Rusty Bentzinger married a caulking gun to a panel-cutting jig and claimed honors as Top Shop Tip winner for this issue.

Rusty Bentzinger must have been paying particularly close attention in kindergarten the day they taught "sharing." First, he helped his neighbor build a house; then they combined their woodworking tools into one well-equipped shop on that neighbor's property.

While they were shooting the breeze in their co-op shop one day, Rusty came up with this issue's Top Shop Tip, at *right*. Soon, he and his neighbor will be building another home—this time for Rusty—and all of the cabinets and moldings will be made in the shared shop.

Take a tip from Rusty and share a great idea with your fellow readers. If we publish your solution to a woodworking dilemma, we'll pay you $75. We could choose your tip as our Top Shop Tip, in which case we'll kick in a tool prize worth at least $250. Send your suggestion, along with your name, address, and daytime telephone number to:

Tips From Your Shop (And Ours)
WOOD® Magazine
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Des Moines, IA 50309-3023

We only use original shop tips, so please send your ideas only to *WOOD* magazine. Please note that we cannot return your submissions. Thanks!

Dave Campbell
GENERAL-INTEREST EDITOR

Caulking gun makes a sure-shootin' holddown

When designing a panel-cutting jig for my tablesaw, I wanted a way to firmly clamp a workpiece in the jig. The solution was in the paint department of the local discount store.

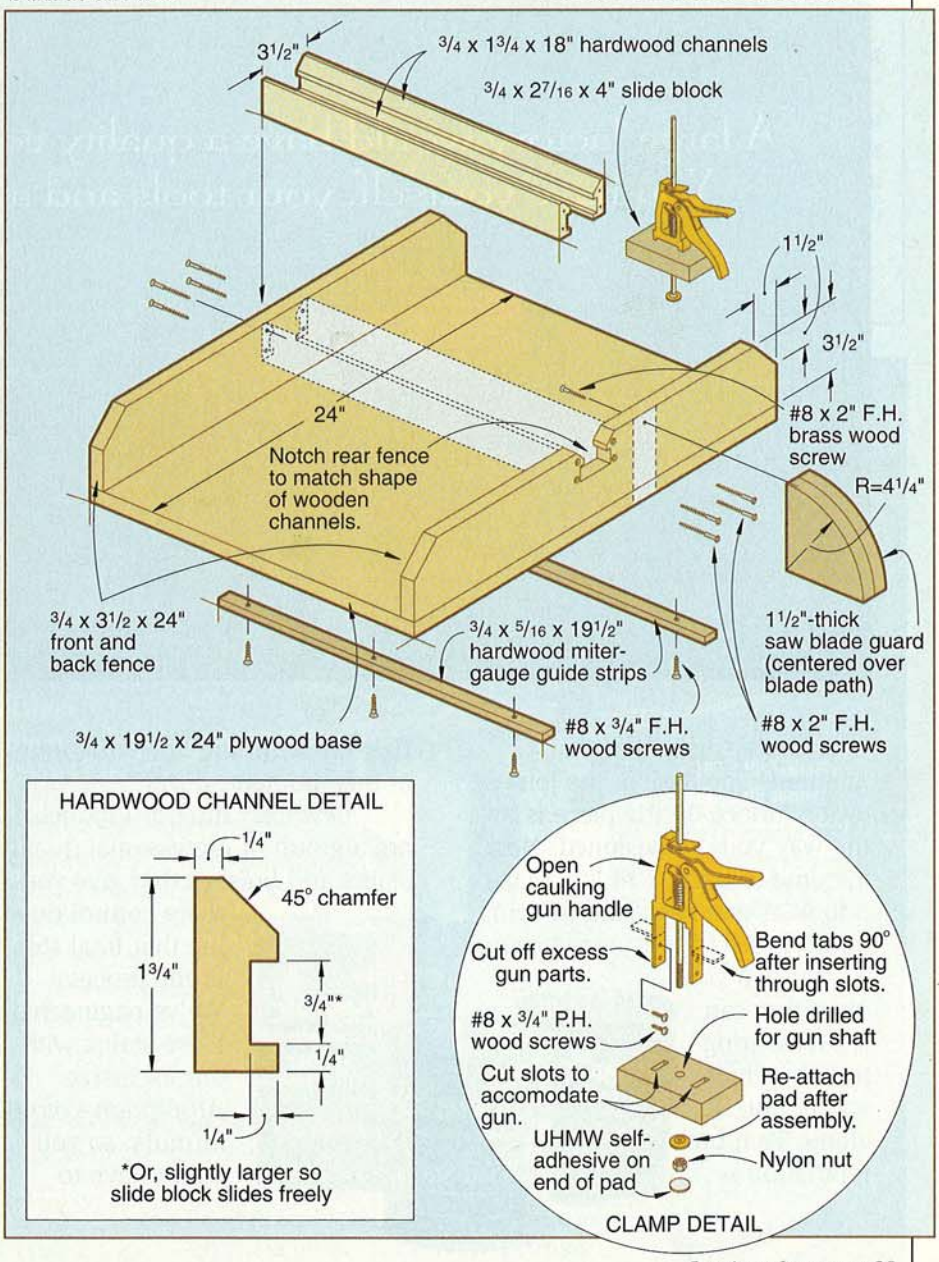
I bought an ordinary bar-style caulking gun for less than $3, threaded off the nylon nut that holds the plunger pad to the rod, and attached the clamp to a hardwood block as shown in the Clamp Detail drawing *below*. The block moves back and forth in a channel on the panel jig, which I built as shown.

Top Shop Tip winner Rusty Bentzinger can use his new Accuset 18-gauge brad nailer, compressor, and accessories when building his new house.

TOP SHOP TIP

To use the clamp, I simply slide it over my workpiece. A few quick squeezes of the trigger secures the piece for a safe cut.

—Rusty Bentzinger, Leighton, Iowa


3 1/2"
3/4 x 1 3/4 x 18" hardwood channels
3/4 x 2 7/16 x 4" slide block
1 1/2"
3 1/2"
24"
Notch rear fence to match shape of wooden channels.
#8 x 2" F.H. brass wood screw
R=4 1/4"
3/4 x 3 1/2 x 24" front and back fence
3/4 x 5/16 x 19 1/2" hardwood miter-gauge guide strips
1 1/2"-thick saw blade guard (centered over blade path)
3/4 x 19 1/2 x 24" plywood base
#8 x 3/4" F.H. wood screws
#8 x 2" F.H. wood screws
HARDWOOD CHANNEL DETAIL
1/4"
45° chamfer
1 3/4"
3/4"*
1/4"
1/4"
*Or, slightly larger so slide block slides freely
Open caulking gun handle
Cut off excess gun parts.
Bend tabs 90° after inserting through slots.
#8 x 3/4" P.H. wood screws
Hole drilled for gun shaft
Cut slots to accomodate gun.
Re-attach pad after assembly.
UHMW self-adhesive on end of pad
Nylon nut
CLAMP DETAIL

Continued on page 29

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If you don't find this the most unique drill you've ever used, bring it back to Sears for a full refund. As always, Sears policy is Satisfaction Guaranteed Or Your Money Back!

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Craftsman leads the way in innovation, both big and small. Whether it's a major design breakthrough or just a small time-saving feature, Craftsman power tools keep getting better year after year!

Craftsman mortise and tenon fixture lets you make beveled, mitered and straight joints with just a single router bit. It's fast, easy and the results are amazing.

Craftsman deluxe dovetail fixture takes time and guesswork out of making solid, secure dovetail joints. It clamps down stock up to 16-in. wide and guides your router to make precise cuts that would impress a master cabinetmaker.

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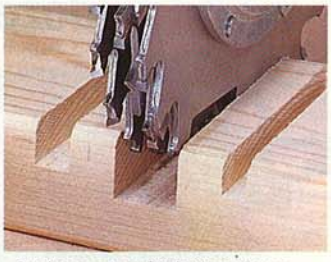
THE DO-IT-ALL DADO!
Craftsman 3-blade dado can be infinitely adjusted to cut grooves from 1/4 to 13/16-in. Just dial the width you need. Carbide tipped blades last longer than regular blades.

No need to change or remove blades! Dial the width of cut you desire



Produces a true flat bottom groove.

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25,000 rpm no-load speed router for smooth cutting

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YOU'RE IN TOTAL CONTROL!
Craftsman router table with extensions provides over 570 sq. in. of smooth surface that won't scratch your work. A multi-functional fence has a clear guard and special jointer fence for cutting straight edges.

Craftsman 2-HP router is powered by a 9-amp motor. Depth of cut can be adjusted from 0 to 1 1/2-in.

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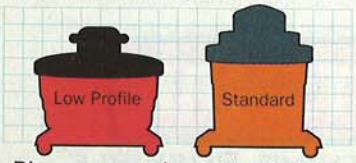
When Craftsman tools were first introduced, the goal was to make the most dependable, innovative yet affordable tools ever made. 70 years later, we've never stepped back off that lofty goal.

The **Craftsman Multi-saw** gives you the ability to perform a wide range of tough cutting tasks, anywhere! It cuts like a reciprocating saw with the maneuverability of a sabre saw. Powered by a 12v rechargeable battery.

Craftsman 24-in. scroll saw with two speed motor is ideal for intricate high-speed cutting. Capacity is greater than ever. Cuts up to 1 3/8-in. deep at 45° or 2-in. deep at 90°. Perfect for larger, more detailed projects.

Our **Craftsman low profile vac** breaks the mold for wet/dry vacs. It has a wider, shorter design that is dramatically more stable, putting an end to accidental tipovers.



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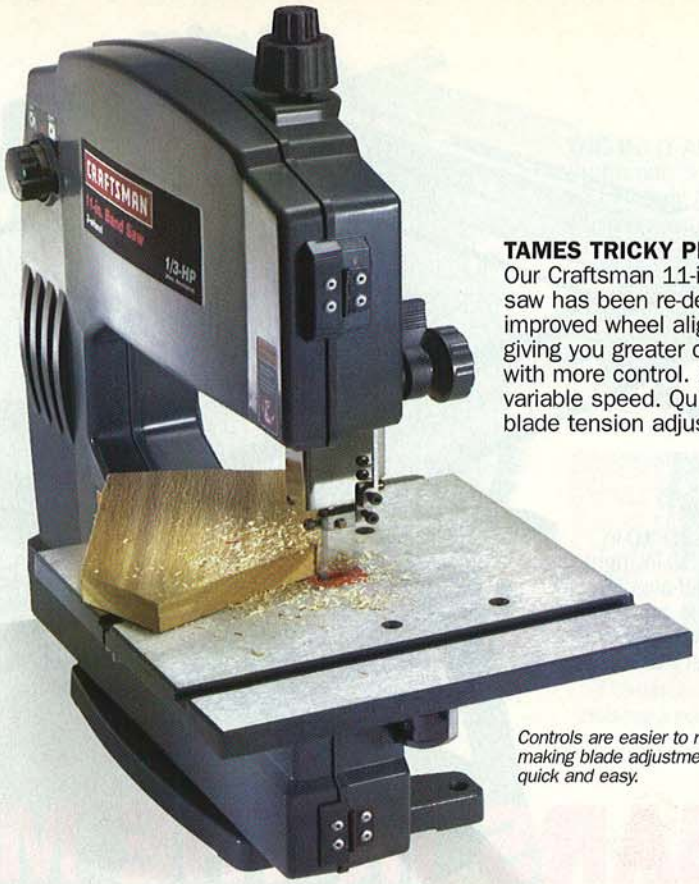

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Our Craftsman 11-in. band saw has been re-designed for improved wheel alignment, giving you greater capacity with more control. Electronic variable speed. Quick-release blade tension adjustment.

Controls are easier to read, making blade adjustments quick and easy.

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NO TIPPING ALLOWED!
Craftsman low profile 16-gallon wet/dry vac is designed shorter and wider to help prevent tipovers. Plus the hose locks into the base and won't come loose when pulled.

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The drain port is designed lower for more thorough draining

*Source: Jan. 1998 Equitrend® Brand Survey conducted by Total Research® Corporation. Top 5 quality brands as rated by American men: 1. Craftsman. 2. Mercedes Benz. 3. Kodak. 4. Chiquita 5. Hallmark.

COVERING ALL THE ANGLES!
Craftsman 15-in. drill press with an adjustable worktable that tilts up to 40 degrees. The powerful 12 speed motor gives you ultimate flexibility. Built-in worklight has its own separate switch.

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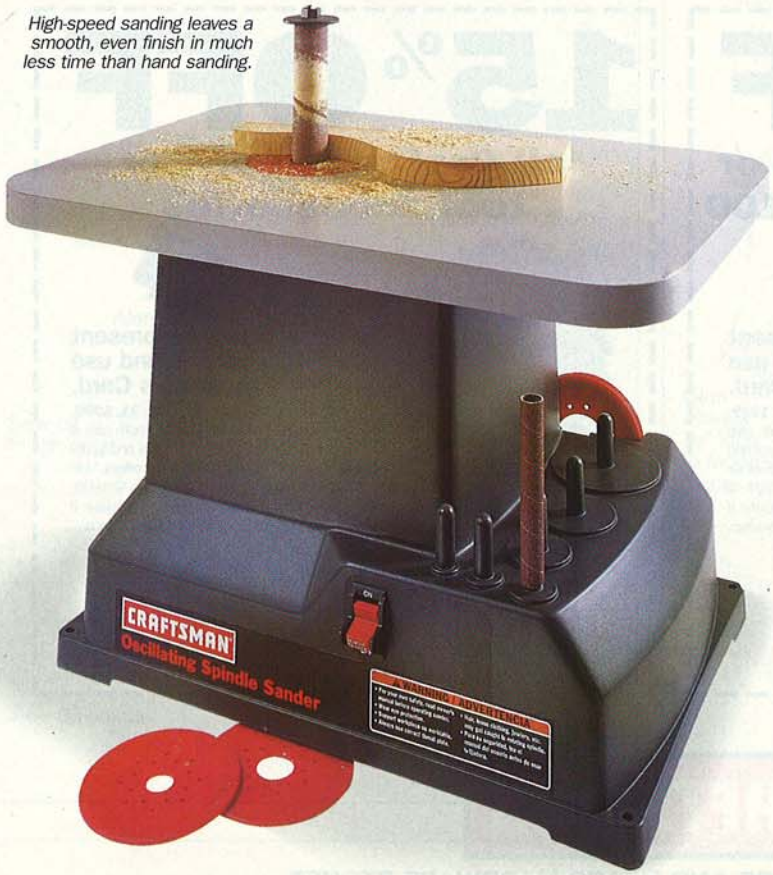

SMOOTH CURVES AHEAD!
Craftsman oscillating spindle sander is designed for delicate sanding and shaping of curved areas. The spindle simultaneously turns at 2,000 rpm and oscillates up and down 58 times per minute.

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Continued from page 22

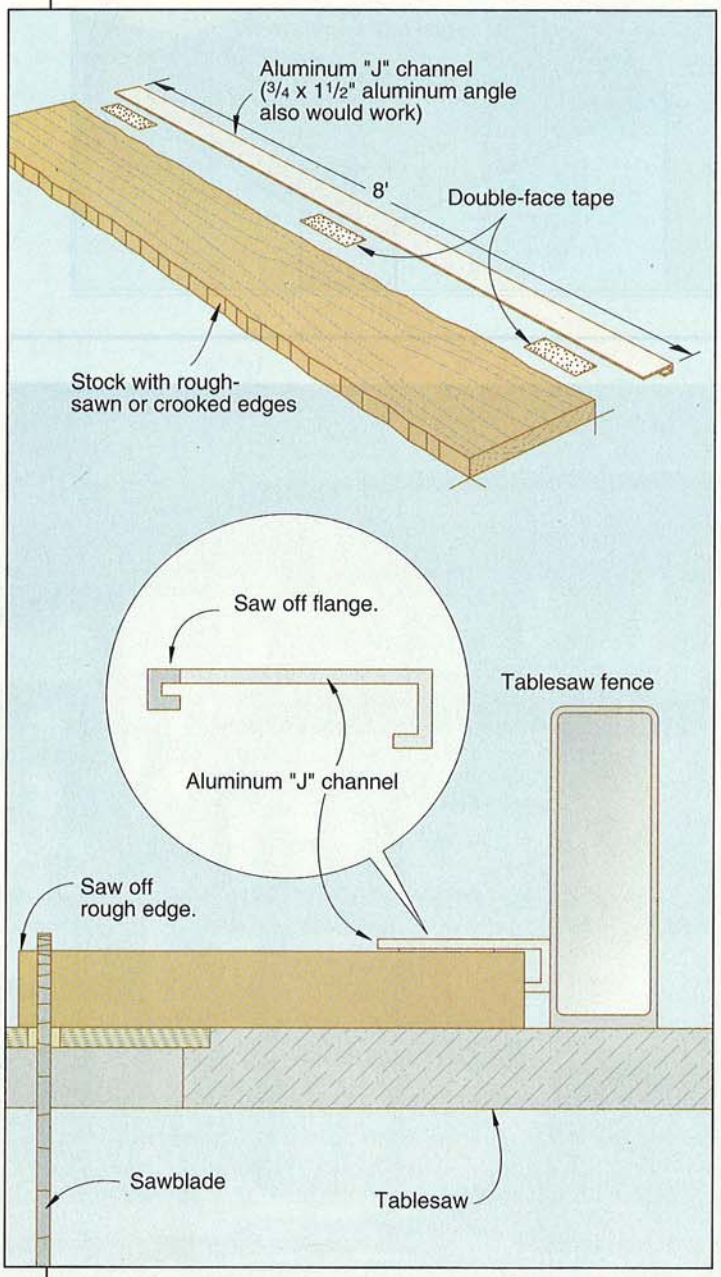
To joint long pieces of material, tune in to J-channel

I needed to put a nice straight edge on a long piece of stock, but because the piece was longer than my jointer's tables, I wasn't having much luck. I headed to the hardware store and bought an 8' length of aluminum J-channel (normally used with aluminum siding).

I sawed off the flange as shown *below*, and attached the J-channel to my board with cloth-backed double-face tape. Keeping the channel against my tablesaw's rip fence, I then cut a straight edge on the opposite edge.

With this one 8' piece of J-channel, I've found I can joint stock up to 10' long. The tape will keep its tack for many boards if you wipe the dust from the wood before applying the channel.

— Ron Radecki, Grand Rapids, Mich.



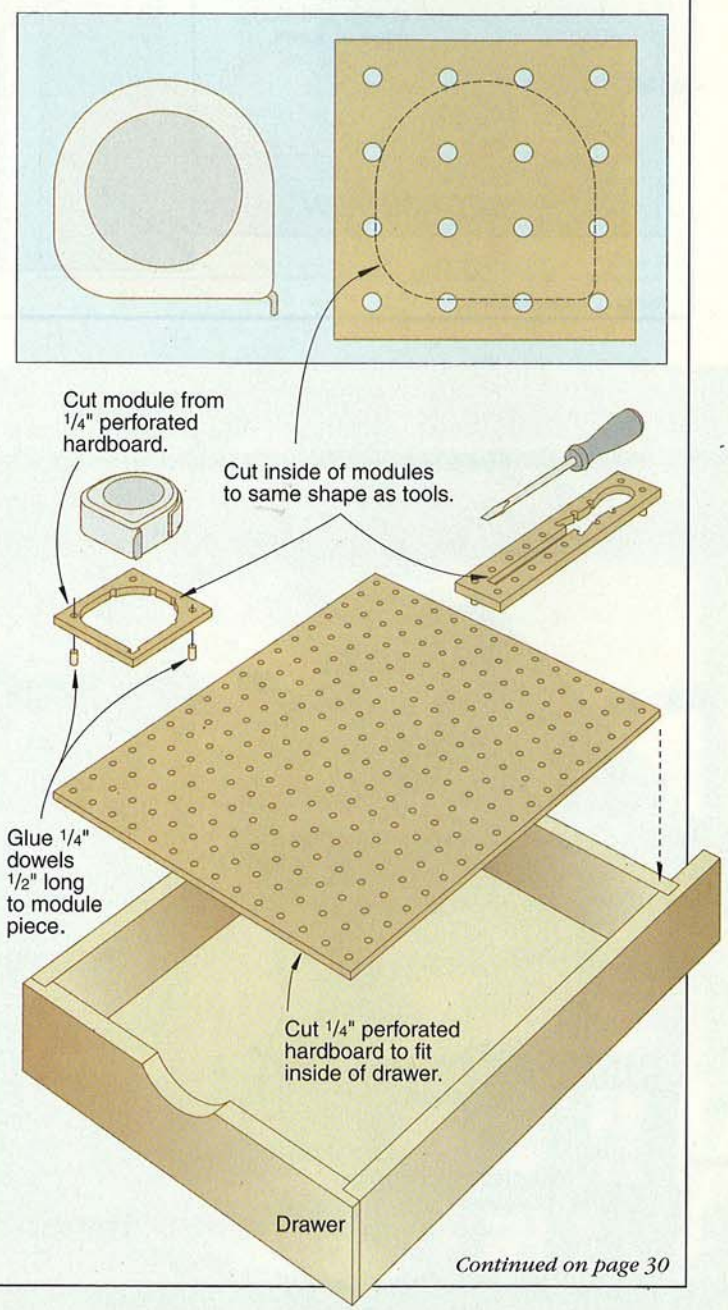
Give your tools a modular home with this drawer organizer

For years, I've pondered how to keep existing tools in place in drawers and still leave room for new tools. Finally, I devised a modular system that gives me a solution.

First, I cut a sheet of ¼" perforated hardboard to fit into the bottom of each drawer. Then, I drew an outline of each tool on another piece of perforated hardboard, and cut a rectangular module around each tool outline. I cut out each tool's shape with a scrollsaw, and glued ¼" dowels into two corners of each module.

The dowels pin the modules into place in the drawer, and the cutouts keep the tools in their place. For maximum organizational flexibility, cut all the module dimensions to even 1" increments—that way they'll more easily interchange.

— Jonathon Sommer, Roy, Utah



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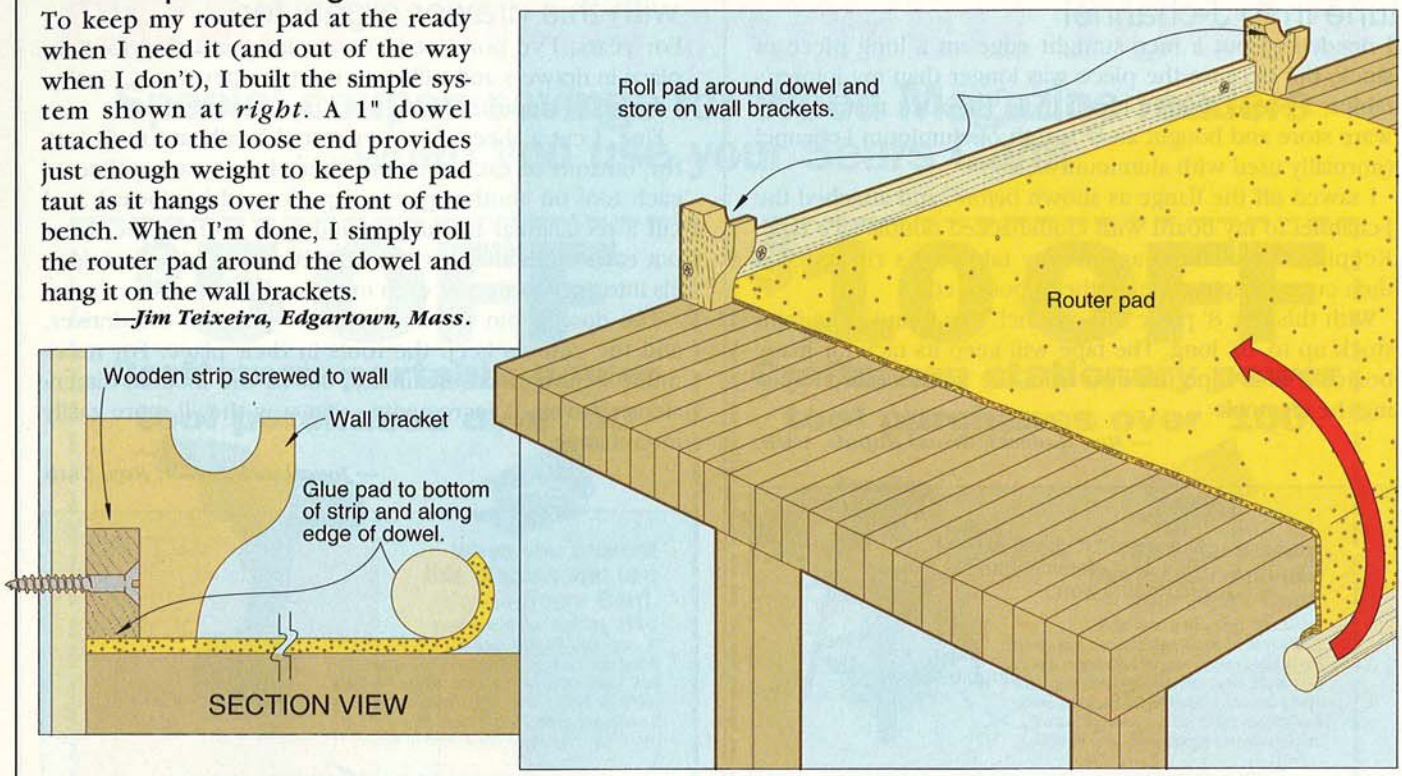
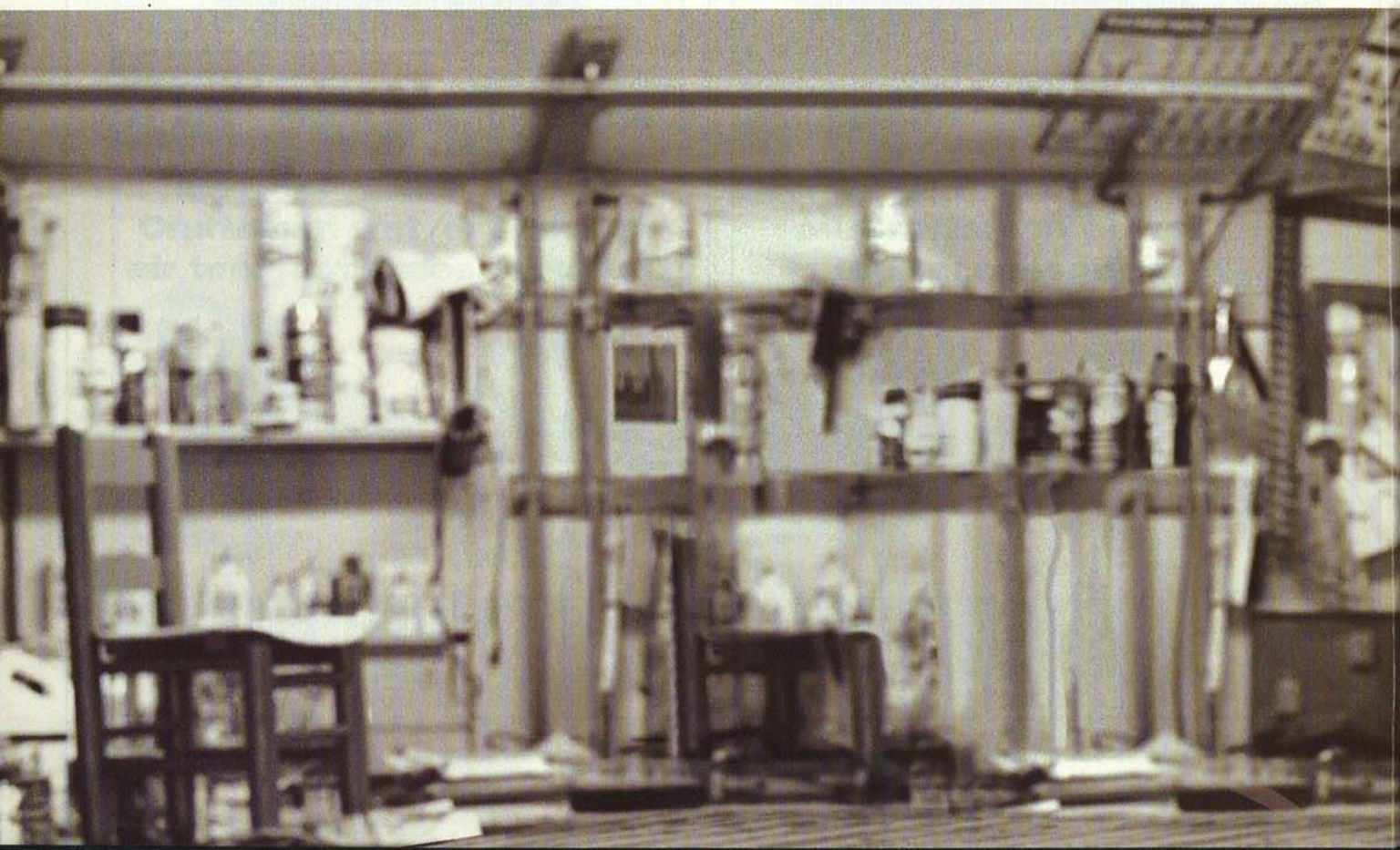
Continued from page 29

Router pad storage solution: roll and tuck

To keep my router pad at the ready when I need it (and out of the way when I don't), I built the simple system shown at *right*. A 1" dowel attached to the loose end provides just enough weight to keep the pad taut as it hangs over the front of the bench. When I'm done, I simply roll the router pad around the dowel and hang it on the wall brackets.

—Jim Teixeira, Edgartown, Mass.


Roll pad around dowel and store on wall brackets.
Router pad
Wooden strip screwed to wall
Wall bracket
Glue pad to bottom of strip and along edge of dowel.
SECTION VIEW



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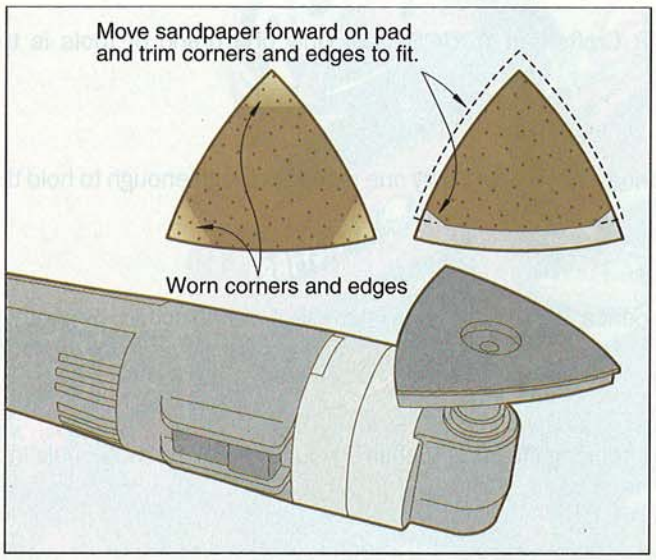
More mileage for detail discs

I've noticed that the outer edges of discs on my detail sander wear more quickly than the center area. To get better "mileage" out of each disc, I move the disc forward on the pad, trim off the worn areas and proceed to use the fresh sandpaper. Moving the disc forward twice triples its life.

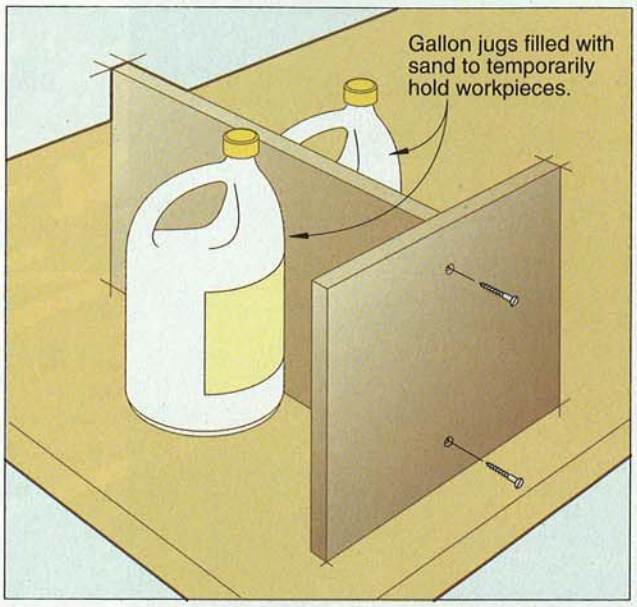
—Bill Bartz, San Jose, Calif.



Yet another use for milk jugs

Here's a simple way to temporarily support workpieces: Fill plastic gallon jugs with sand and set them as shown below. The plastic won't mar the wood, and you also can use the jugs as weights for gluing.

—Victor Bang, Mesa, Ariz.



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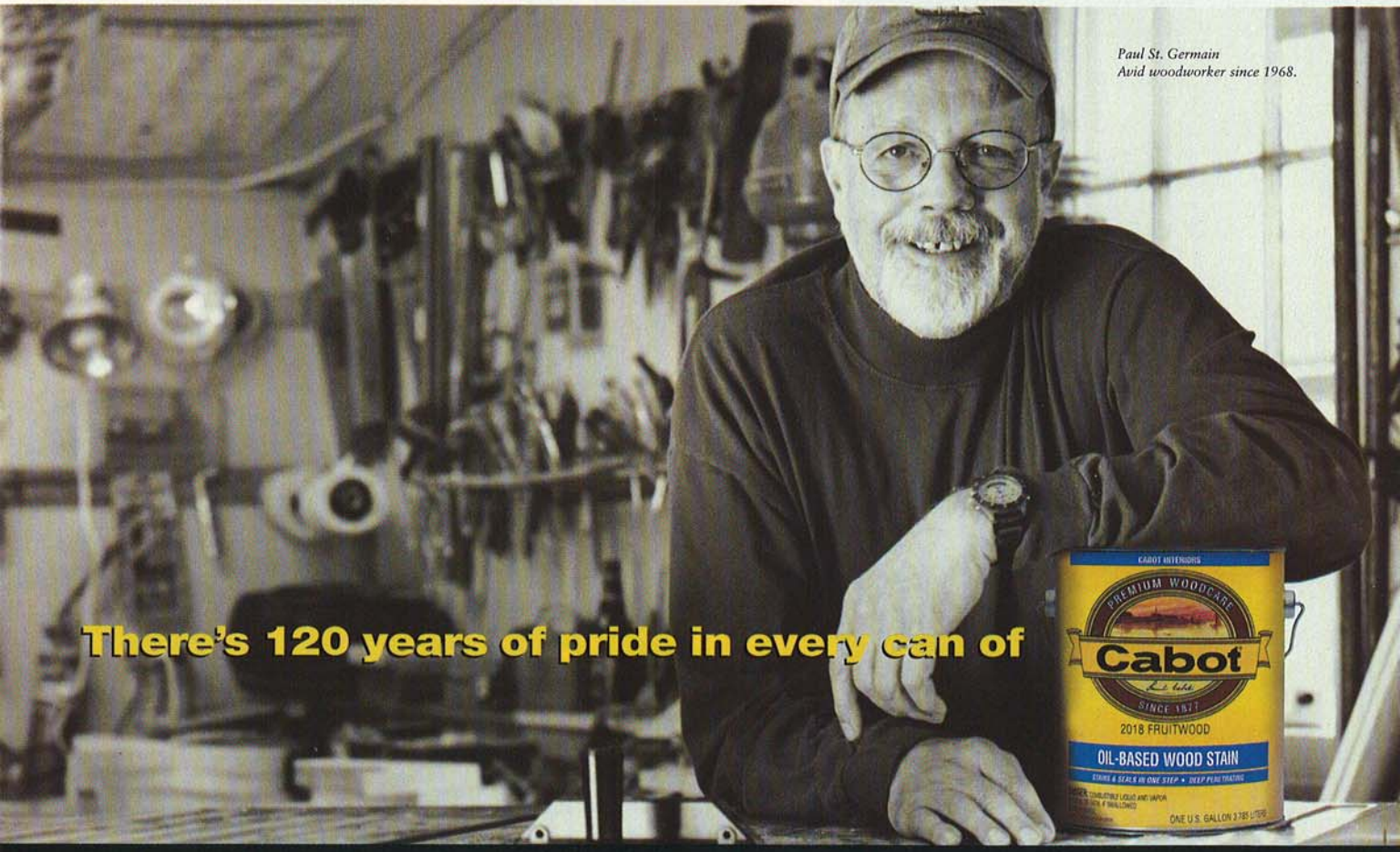

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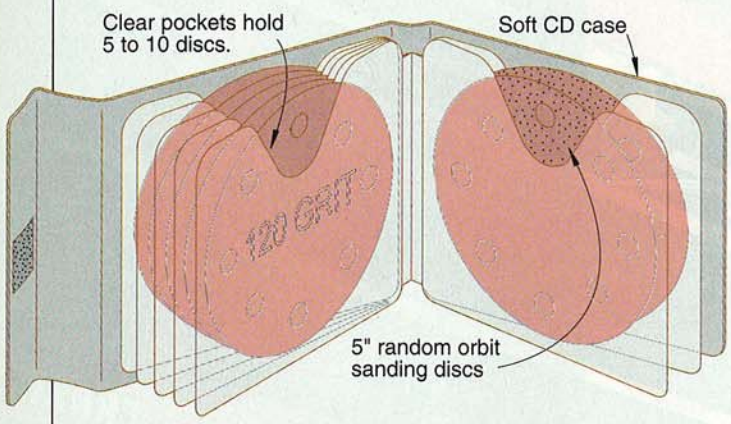
Continued from page 31

Compact organizer for sanding discs

After buying a combination-pack of 5" sanding discs, I puzzled over how to organize the ten different grits included in the package. A soft-sided compact disc holder from the mall music store solved the problem. The CD pockets each hold 5-10 sanding discs, and I labeled each pocket with the grit inside.

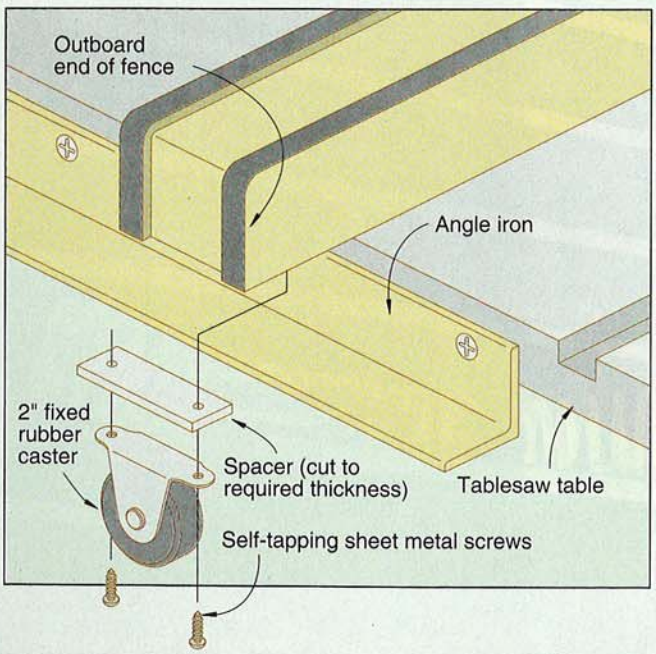
— Dean Hallal, Sumter, S.C.



A wheel of a solution for dragging rip fences

The rip fence on my Powermatic 66 tablesaw didn't glide as smoothly across the tabletop as I liked, so I made a $5 improvement. I bought a 2" fixed rubber caster at the hardware store and attached it to the bottom of the far end of the fence, as shown *below*. The wheel rolls on the angle iron attached to the back of the saw. I put a spacer between the caster and the fence to give me 1/32" clearance above the tabletop. The fence now glides effortlessly across the table.

— William Marazita, Santa Barbara, Calif.



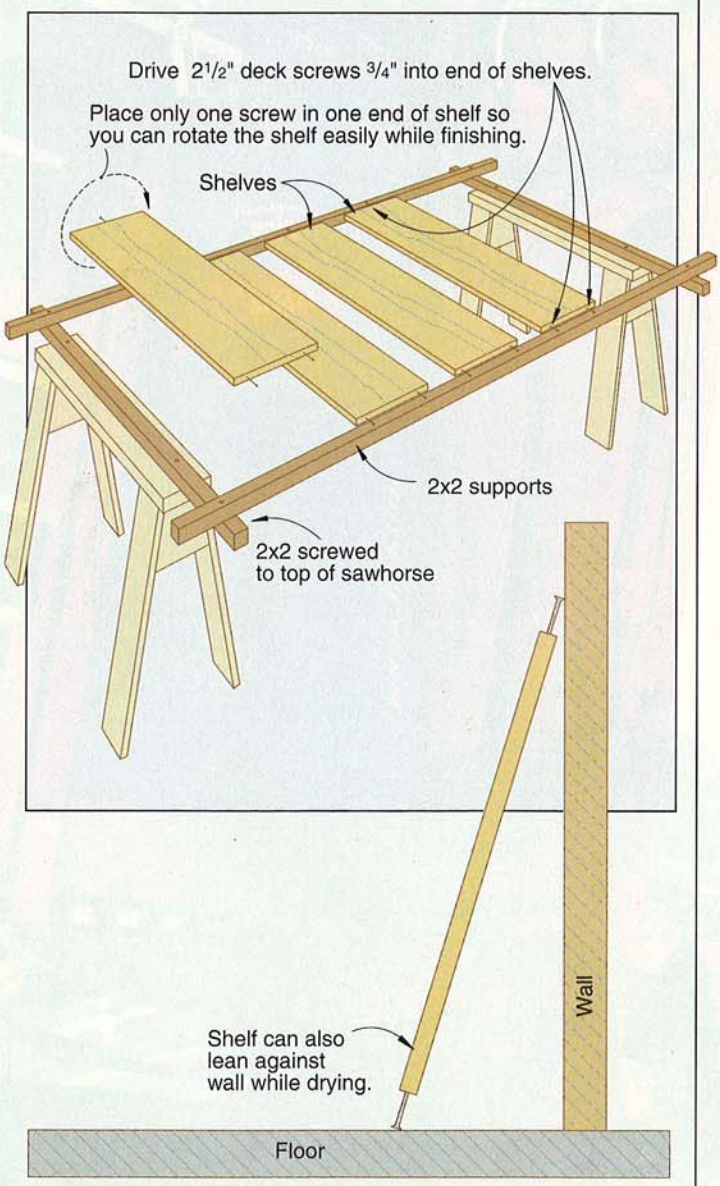
A few screws cut shelf-finishing time in half

I recently built a bookcase and wanted to spray lacquer on both sides of the shelves. I could have set the shelves on nailpoints, but I wanted to keep the fresh finish absolutely untouched. So, I came up with a touchless method.

Fasten a frame of 2×2s, spread 1" wider than the length of the shelves, to a pair of sawhorses as shown *below*. Into the center of one end of each shelf, predrill a shallow hole, and drive a 2½" deck screw into the hole, leaving about 1¾" of the screw sticking out. Using the same process, put two screws into the other end of each shelf.

To finish the shelves, lay them across the frame, resting them on the screws. When one side is finished, grab the shelf by the two screws and flip it over, rotating it on the single screw on the other end. If your frame won't hold all of your shelves, lean the finished shelves against a wall—two-screws down—to dry.

—Kevin Bevins, Summerville, S.C.


Drive 2½" deck screws ¾" into end of shelves.
Place only one screw in one end of shelf so you can rotate the shelf easily while finishing.
Shelves
2x2 supports
2x2 screwed to top of sawhorse
Shelf can also lean against wall while drying.
Wall
Floor

Continued on page 36

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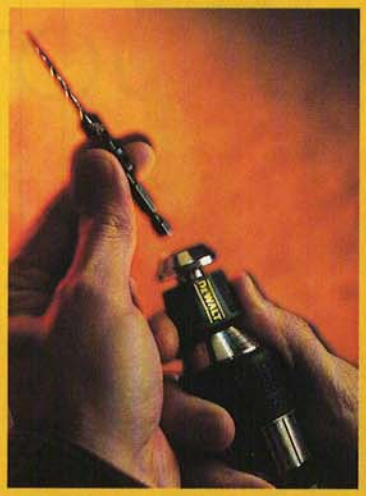

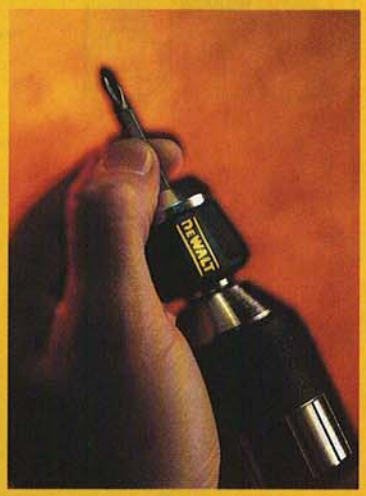

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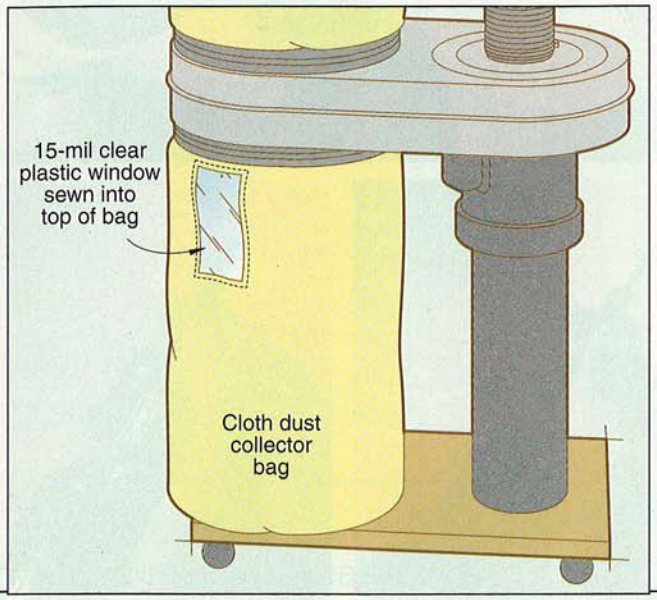
Continued from page 34

Window shows when dust collector gets full

When I ran a bunch of lumber through my 15" planer, I never knew how full the bottom bag on my dust collector was until it overflowed. To solve this problem, I cut a 3×6" hole near the top of the bag and sewed in a 15-mil plastic "window" that lets me see when the bag gets full.

—Don Bacik, Clay, N.Y.

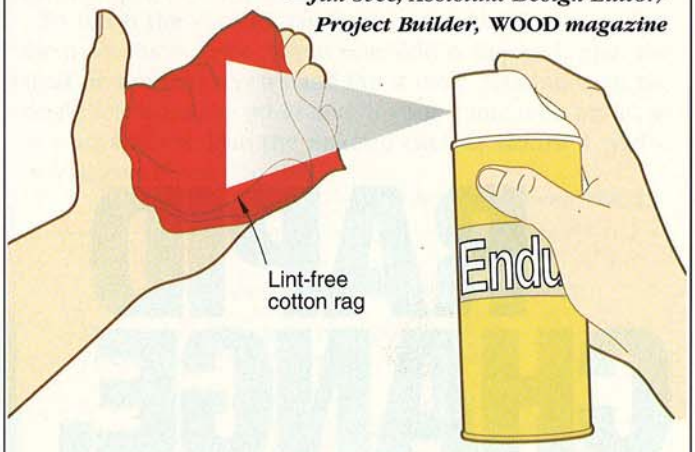


Endust polish renews ragtag tack cloths

I've tried using commercially available tack cloths, but found they sometimes leave a sticky residue on the workpiece. They're also expensive for their limited useful lifespan.

For a simple, inexpensive alternative, I use Endust furniture polish sprayed onto a lint-free cotton rag. The Endust helps capture the dust, but doesn't leave any residue on the wood. When the rag gets too dirty to shake clean, I throw it in the wash and reuse it.

—Jan Svec, Assistant Design Editor/ Project Builder,* WOOD *magazine



Continued on page 38

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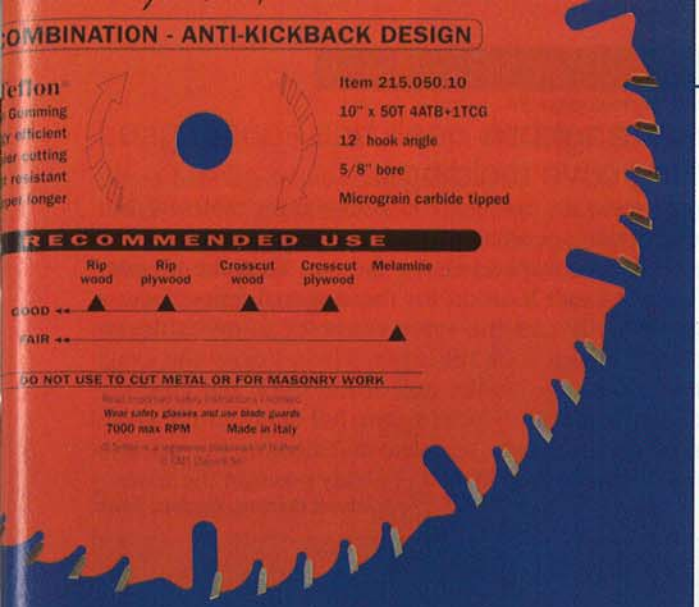

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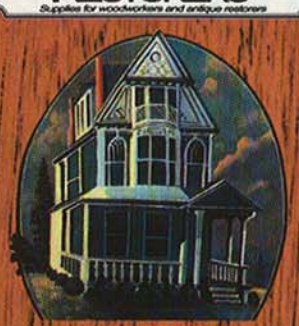

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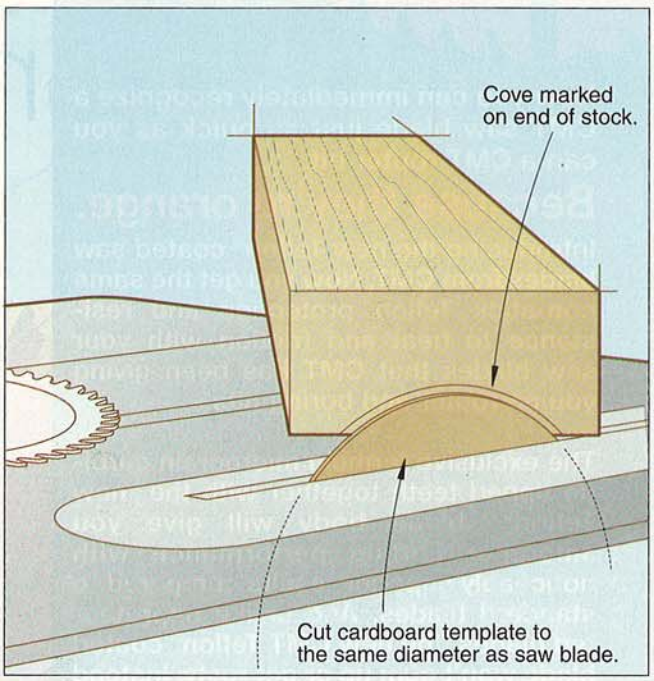
TIPS FROM YOUR SHOP (AND OURS)

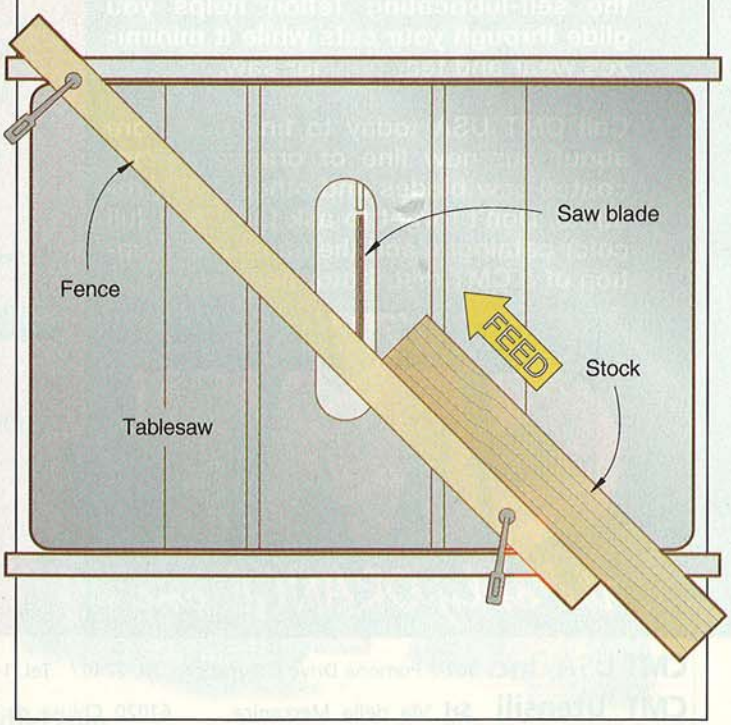
Continued from page 36

A new angle on cutting cove moldings

I like to make my own cove molding on my tablesaw, but I found myself spending a lot of time in trial and error setting up the auxiliary fence for the cut. To make it easier to find the exact location for the diagonal fence, I cut a piece of cardboard the same diameter as my tablesaw blade and mount it on the arbor. Then, I draw the exact radius of the cove on the end of the stock and raise the cardboard template "blade" to the full depth of the cove. By sighting around the template and aligning the stock to match the marked cove, I can quickly position the fence.

—Michael Burton, Ogden, Utah



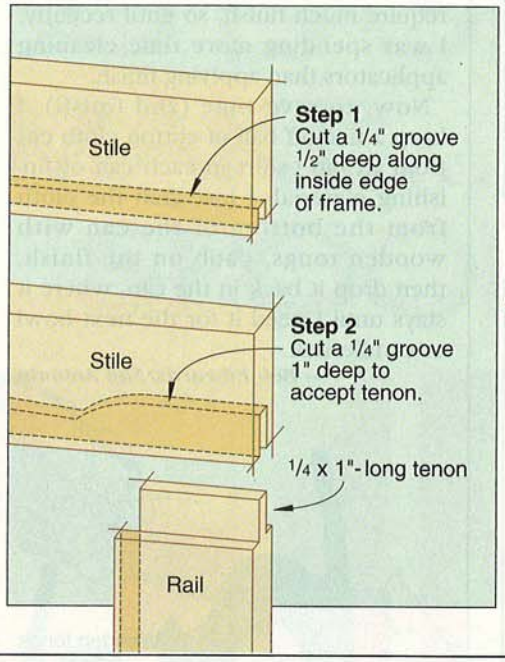


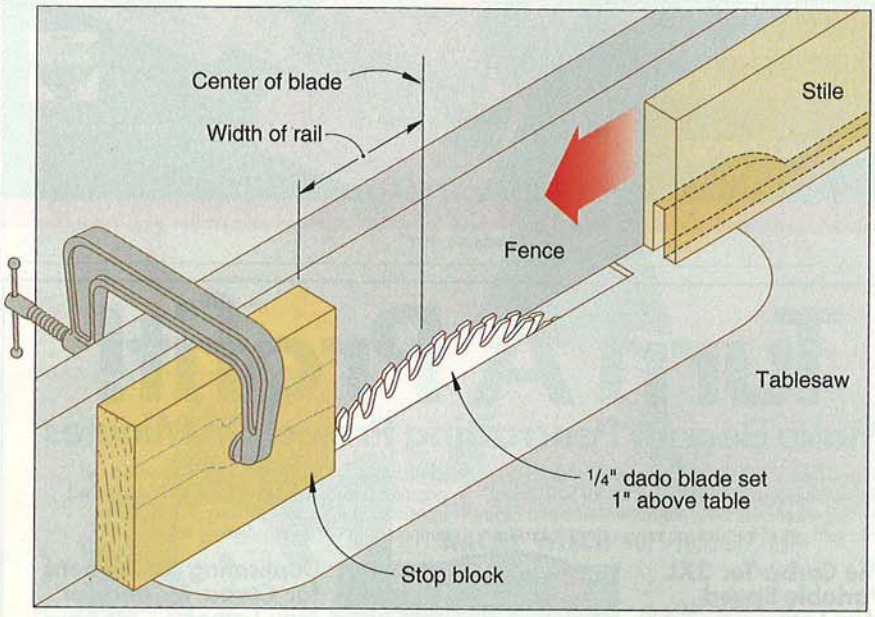
Long tenons and deep dadoes make strong frames

When building frame-and-panel doors, I make them extra strong by making the tenons extra long. Rather than chisel out a deep mortise, here's how to cut them on a tablesaw.

In the stiles, center a ¼" deep groove for the panel with your dado blade. Then, raise the tablesaw blade up to 1". Measure the width of your tenon, and clamp a stopblock to your tablesaw fence as shown *below*. Run the stile groove-side down into the dado blade again until it contacts the stopblock.

— Erv Roberts, Des Moines, Iowa





Continued on page 40

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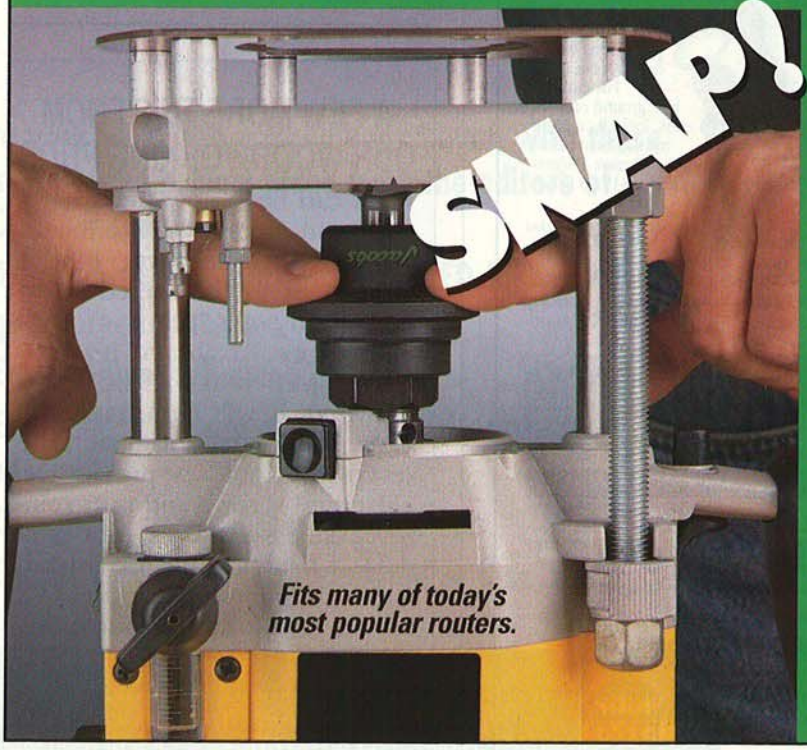

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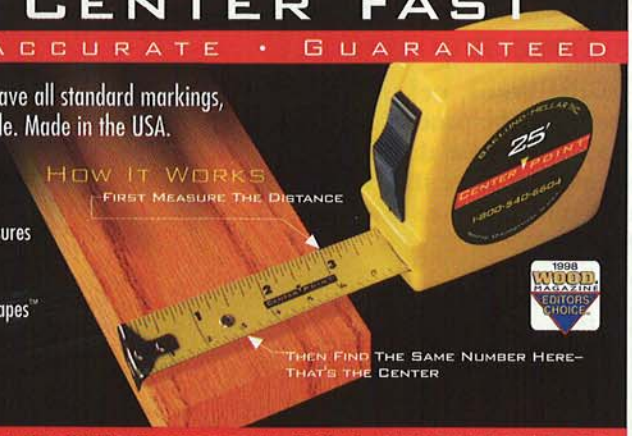

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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 39

Need a handy finish applicator? It's in the can!

Like other woodturners, I use a lot of different finishing materials—sanding sealer, oils, stains, etc.—on my projects. My turnings are small and don't require much finish, so until recently, I was spending more time cleaning applicators than applying finish.

Now, to save time (and finish), I keep a tied-off ball of cotton cloth cut from an old t-shirt in each can of finishing material. I just grab the cloth from the bottom of the can with wooden tongs, daub on the finish, then drop it back in the can, where it stays until I need it for the next bowl or candlestick.

— Bob Edwards, San Antonio

A FEW MORE TIPS FROM OUR WOODWORKING PROS

- You can have new brass hardware and mounts cast to match missing antique parts. Find a foundry with the boxed information on *page 50*.
- On *page 71*, learn how to make your own marine-grade plywood. It will help fragile filligree last longer and match the rest of your outdoor project.
- Machine screws and nuts reinforce stressed joints, but may detract from a project's appearance. On *page 82*, see how we hid the hardware on our casserole carrier.

FROM

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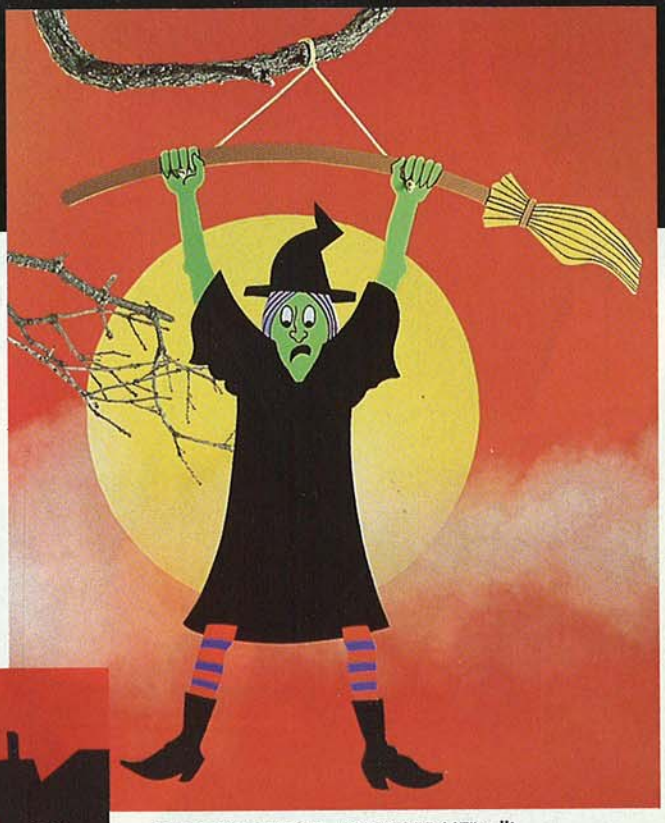

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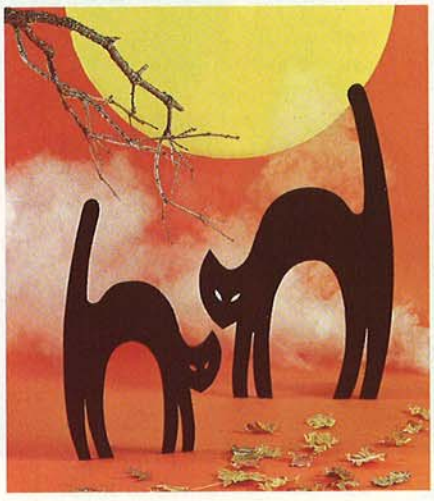

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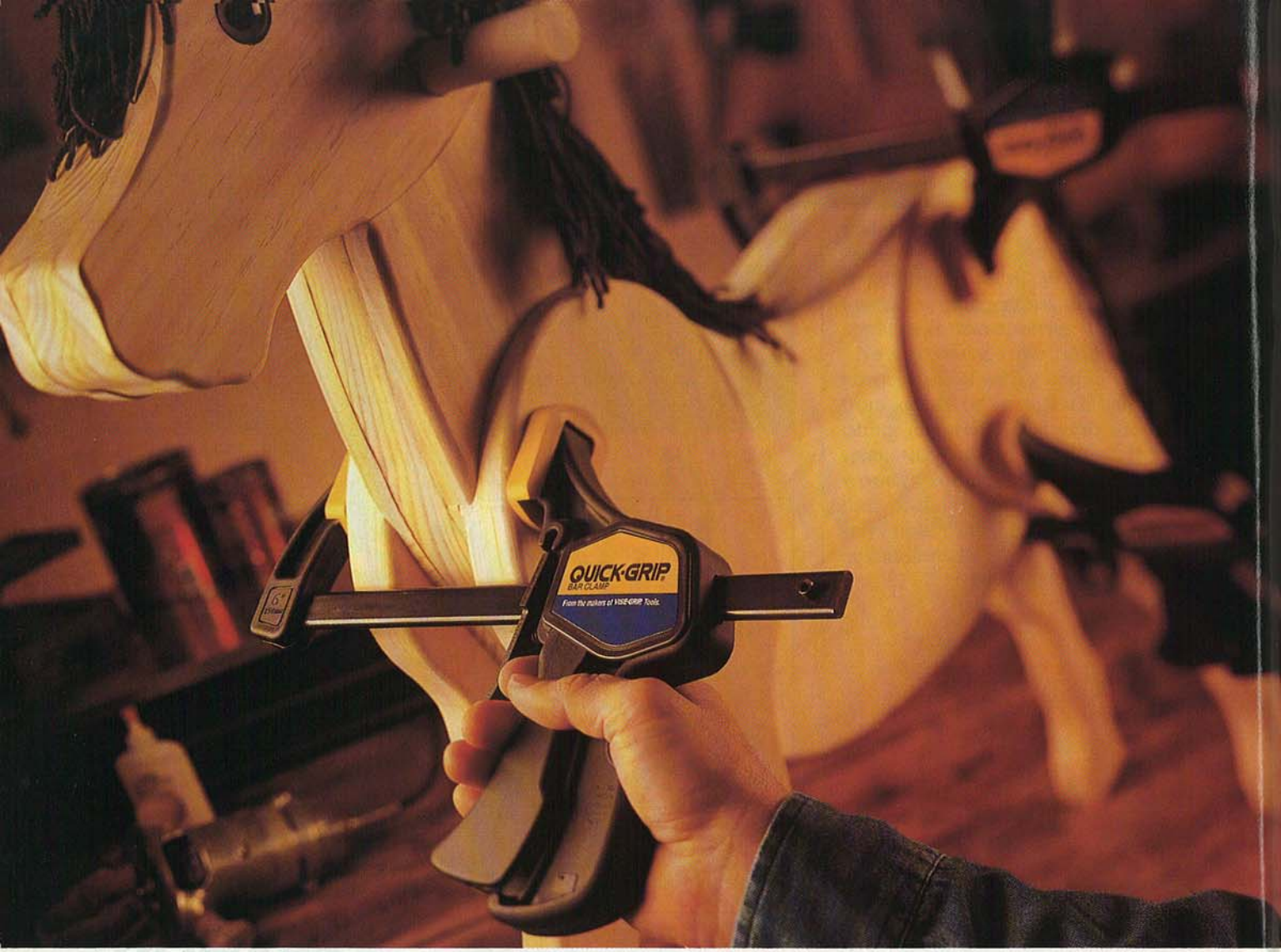

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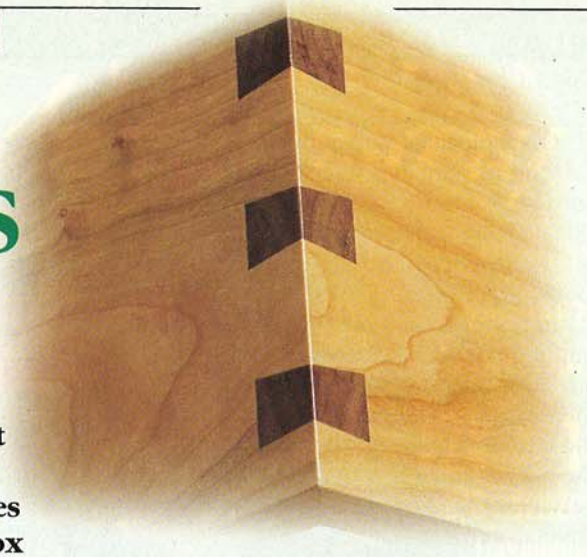


Perhaps no other joint has more strength or better looks than a corner joined by through dovetails. But here's a much simpler joinery process that comes pretty close. With just a router table and a bare-bones homemade jig, you can crank out terrific-looking box corners like the one at *right*.

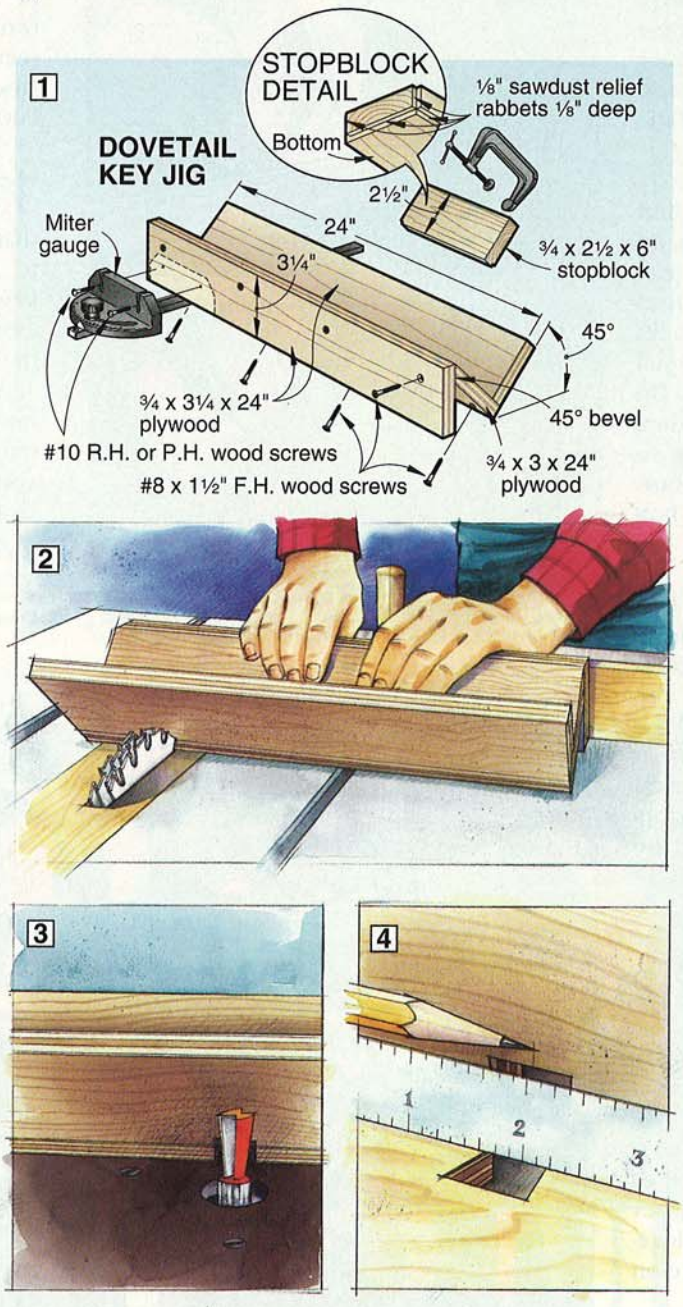
1 The jig at *right* mounts to a miter gauge that slides in the miter slot of a router table. Built to the length shown, on most router tables it will handle boxes with sides up to about 24" wide. You can tailor the length to better suit your router table and to accommodate smaller or larger boxes.

The miter slot-to-router bit spacing on your table may affect the exact placement of the screws. Be sure to put them where the router bit will not cut into them. (Before you build this jig, please read the next step and note.)

2 Mount a dovetail bit in your table-mounted router. We used an 11/16"-diameter bit with an 8° cutter angle and a ½" shank for the dovetails shown in the ¾"-thick stock of the corner shown *top*. Most dovetail bits will work, and you may want to consider using smaller bits for thinner stock. Raise the bit so it will cut to the correct approximate depth through your workpiece sitting in the jig.

Mark the location where the shank of the dovetail bit will pass through the jig in the following steps. You need to remove the stock in this area of the jig so the bit can pass through it. We did so with a dado set as shown. Make this cut through only the "V" portion of the jig—do not cut through the vertical piece that mounts to the miter gauge. You also could make this cut by sawing a series of kerfs with a handsaw and chiseling out the waste.

Note: If your table has a plunge router, it may be impossible to raise the bit high enough to make a full-depth cut. Also, the shorter shanks on smaller bits may prevent the bit from cutting high enough. In that case, you may have to make the jig from ½" plywood.



3 Pass the jig through the spinning dovetail bit as shown. The bit's shank should prevent the bit from passing through the back side of the jig.

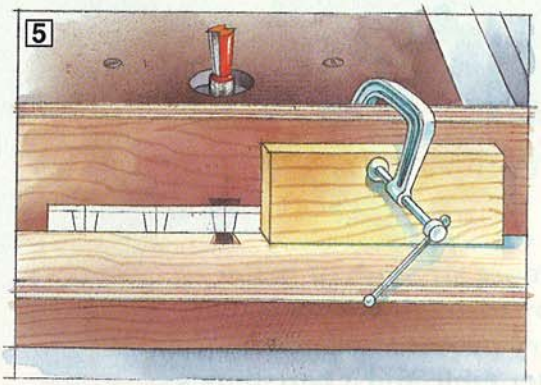
4 Assemble a mitered corner from scrap stock of the same thickness as the wood used in your box. Use this test piece to fine-tune the height of the router bit. Then, on the inside of the "V," mark the center of the dovetail cut as shown.

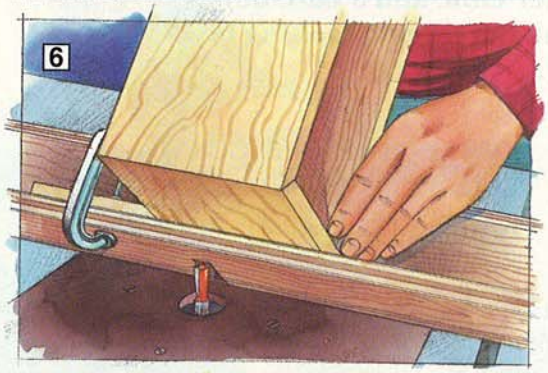
Continued on page 44

Continued from page 43

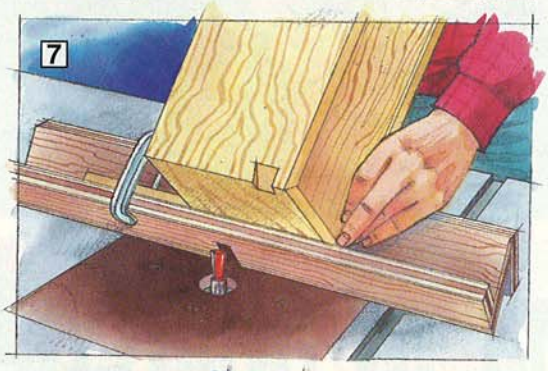
5 On a piece of paper that's as long as your box corners, lay out the position of the dovetails. You can space the dovetails evenly or unevenly, but it usually looks best to have a symmetrical arrangement. For our box, we put one dovetail in the exact center, with equal spacing between the dovetails. The space between the end dovetails and the ends of the corner equal half of the space between the dovetails. Mark the dovetail centers.

Position your layout on the inside of the jig's "V" as shown, with the center of the right-most dovetail aligned with the center mark on the jig. Position and clamp the block at the end of the paper layout.



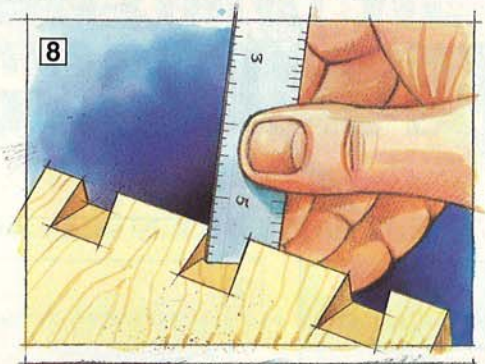


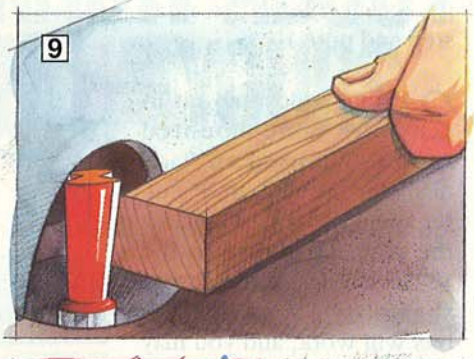
6 Place your box in the jig, butt it against the stop, turn on the router, and pass the V portion of the jig through the bit as shown. After making the cut, lift the workpiece off the jig and pull the jig back through the bit. Do not leave the box in the jig when you pull the jig back—doing so may enlarge the dovetail cut. Make this cut on each of the box corners (four total cuts).



7 Rotate the box 180° so its bottom faces in the opposite direction it faced in the previous step. Butt the box against the stop, and again cut each of the four corners. Rotating the box in this fashion ensures symmetrical spacing. Move the clamped stop-block as necessary to make the remaining cuts.

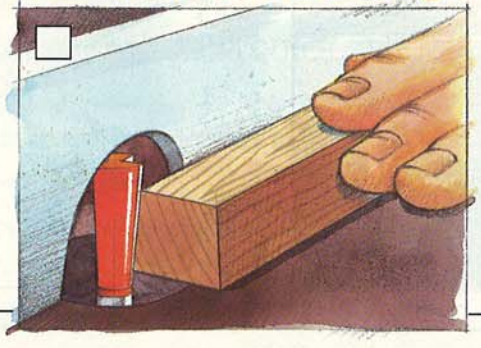
8 Measure the depth of the dovetail cuts as shown. Your dovetail key stock should be 1/16" thicker than the depth of the dovetail cut. Rip this stock so it's 1/16" wider than the widest part of the dovetail cut.

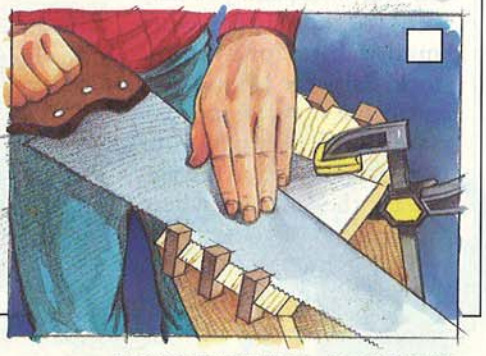




9 Using the same dovetail bit as before, adjust it 1/16" higher than the thickness of your dovetail-key stock. Adjust the fence on your router table so the bit just barely cuts into the key stock at table height as shown.

Pass the stock through the bit. At the end of the cut you will get a small amount of snipe—you'll cut this off later.





10 Rotate the key stock end for end, keeping the same face down. Cut the other edge.

Test the fit of this stock in the dovetail cuts. (Slide the unsniped portion of the stock into the dovetail cut.) The stock should be slightly too wide. Adjust the fence forward just a hair and recut the stock. Do this until the stock fits tightly in the dovetail cuts. Cut off the sniped ends.

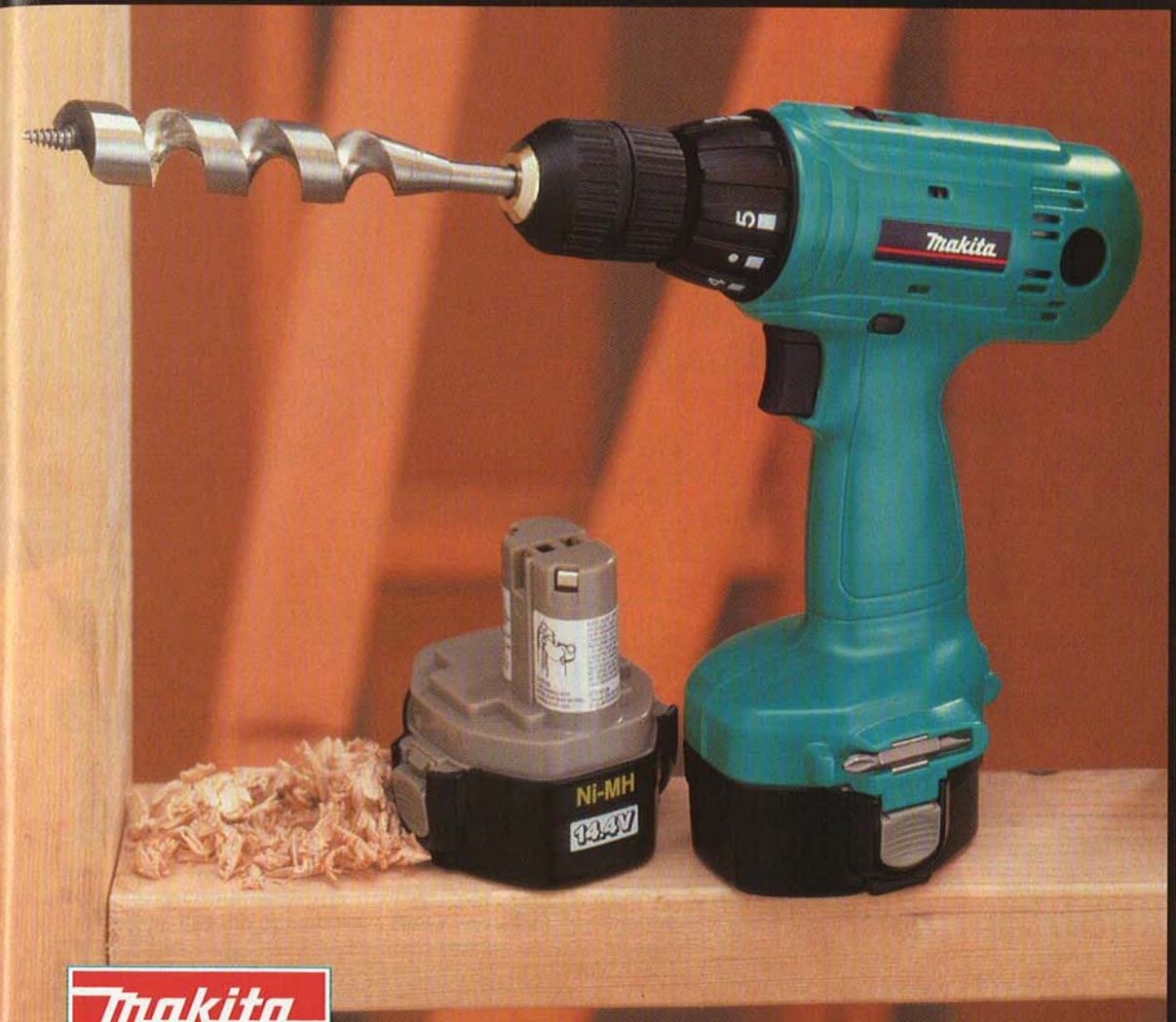
11 Cut the key stock into lengths about 1/4" longer than the dovetail cuts. Apply glue to the dovetail cuts and slide the keys into them, leaving about 1/8" extra key length at both ends of the dovetail cuts.

After the glue sets, saw off the excess key stock. A special flush-cutting handsaw works well, or you can use a typical handsaw if you protect the box with a sheet of card stock as shown.

Written by Bill Krier with Chuck Hedlund
Illustrations: Brian Jensen

Makita 20th CORDLESS Anniversary

1999 marks the 20th Anniversary of the introduction of Makita's first Cordless tool.



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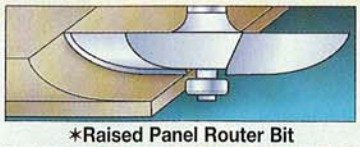

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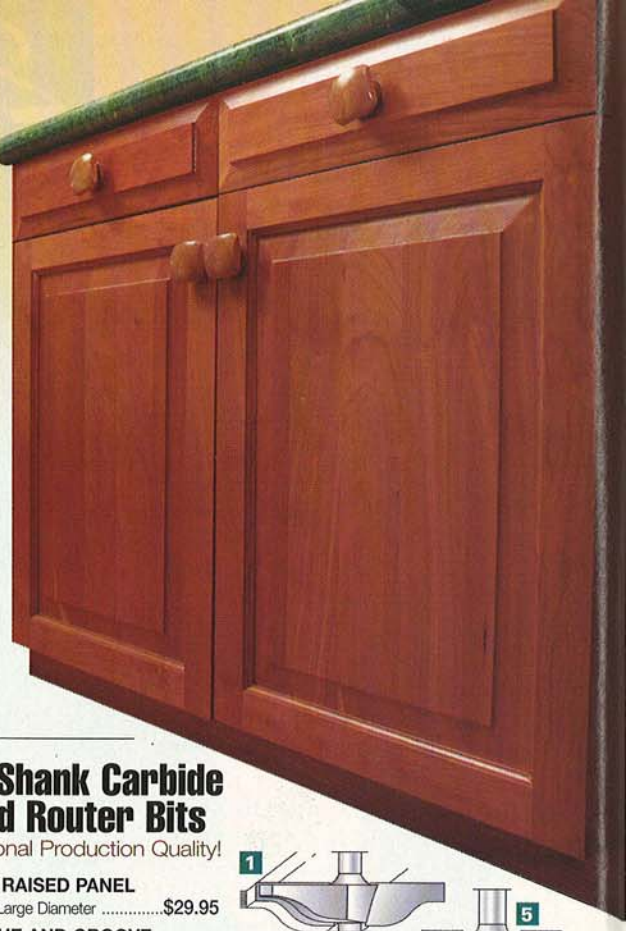

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WOOD Product Scorecard
Merle Clamp-Editors Choice, Winter '97
Performance ★★★★★
Value ★★★★★

- Clamp circles, ovals, rectangles, and with additional corners (see below*) 5, 6, 7, 8 or more sides.
- Ideal for clamping drawers, doors, picture frames, boxes, cabinets, etc. Holds firmly in square.
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#1439 REG. $39.95 .....**SALE $26.95**
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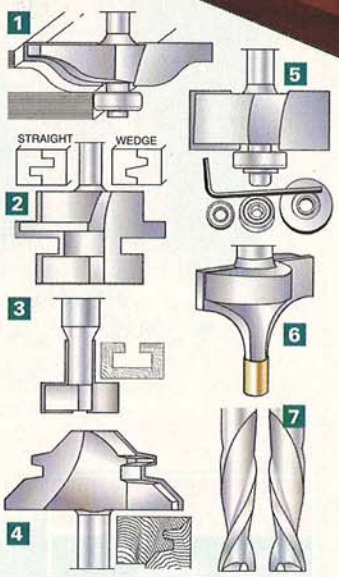

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Special Set Price $19.95

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Follow template of almost any shape to make the recess. Fits Porter Cable, Black & Decker or any router with Porter Cable bushings adapter. Includes 1/8" solid carbide downcut spiral bit, brass bushing, brass template guide, brass retainer nut & instructions.

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High Quality Steel for heavy use

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REG. $141.20.....**SALE $43.95**

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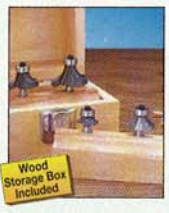
1/4" shank, Carbide Tipped, 4 Round Over Bits with 1/2" OD bearing: (1/8", 1/4", 3/8", 1/2"), plus 3/8"OD bearing and allen wrench.



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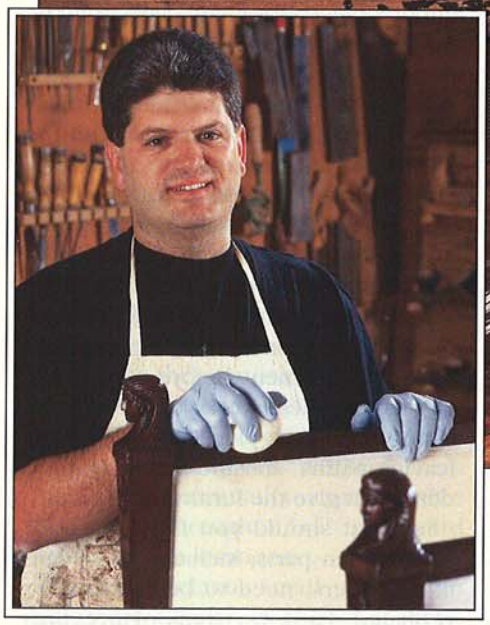
Antique Mystique

Dominick Coiro restores what's good about our furniture past

From trashy to flashy: Before the craftsman began restoring this pair of chairs, the nearly-completed one on the *right* looked just like the one *above*.



Who do well-heeled Manhattanites call on to redo or renew their high-end antique furniture? Those in the know look to the master—Dominick Coiro, a very special woodworker whose skills span centuries.

Continued

Antique Mystique

As Dominick pulls his minivan away from the just-closed Madison Avenue art gallery with the gallery's owner in the front seat, a white stretch limousine stops out front. He asks his matronly passenger if she'd like to reopen the gallery to accommodate the obviously well-to-do guest. "No, it's just [60's music icon] Diana Ross. She'll come back later. I've got to get *you* while I have the chance." So off they go, leaving Ms. Ross and company cooling their heels.

What is it about Dominick Coiro that places him in greater demand than a world-reknowned pop diva? The gallery owner could answer this question in a New York minute: This guy has the rare talent to restore her collection of Boulle-work furniture.

Hey kid, are you old enough to be doing this?

He's only 38 years old, but Dominick already has two decades of high-end furniture restoration experience under his belt. "A lot of times, when I meet people for the first time, they aren't expecting me at the door. They're waiting for some older fella in his 50s or 60s," he chuckles.

For light clamping, Dominick makes clamps from old seat springs. A scrap of veneer protects the furniture from the clamp's sharp points.

Long before he married his childhood sweetheart Marianne, he learned furniture restoration at the side of her father Clem, who repairs and prepares furniture for sale at a major New York auction house.

More than teaching woodworking techniques, Dominick credits Clem with teaching him how to think through the restoration process for himself. "It was hard to get some of his secrets out of him," the craftsman says. "I knew that he knew how to make a particular repair, but when I'd ask him what to do, he'd just look at me and smile. I made a lot of mistakes, but he was always there to guide me along."

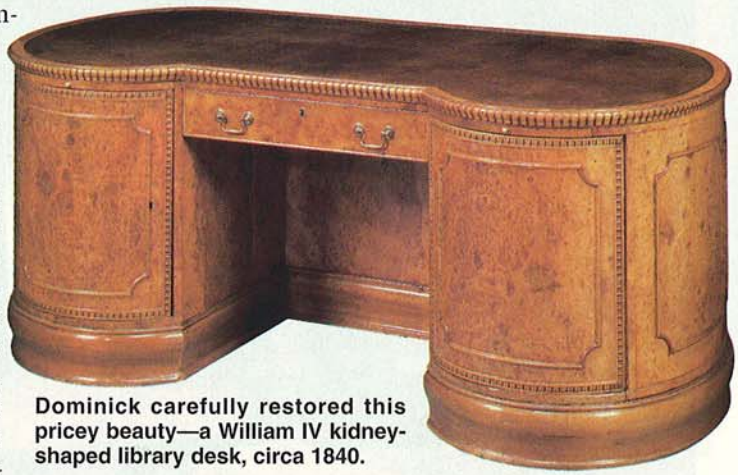
By the time Dominick was 20, he had set up a small shop in his attic (equipped with a 10" bandsaw and a few hand tools) and began restoring furniture on his own. "I restored a couple of small pieces for friends, my name got around, and people started bringing me things," he says.

These days, his 1½-car garage-size shop sports a huge array of old block planes, clamps, and a mainstay of stationery power tools. "I prefer to use hand tools," he says, "but I wouldn't want to cut through 3" mahogany by hand. I'll rough-out a pediment on my bandsaw, then do all my finish-work by hand. Some of the most precious tools in my shop are the spring clamps (shown at *left*) that I make from the seat springs of old sofas," he says enthusiastically. "They're pretty much like my third hand."

While Dominick's business still comes entirely from referrals, the value of the pieces he restores continues to grow exponentially. The priciest piece he's restored to date, the stunning kidney-shaped desk shown *below*, displays the quality of his work. The owner paid more than $43,000 for it, then brought it to the expert for restoration.

Fix only what needs fixing

Some people define an "antique" as anything over one hundred years old. But Dominick says the value of a piece of old furniture lies more in its uniqueness than antique-ness. "A lot has to do with the provenance of the piece—who owned it and where it came from."



Dominick carefully restored this pricey beauty—a William IV kidney-shaped library desk, circa 1840.

Before tearing into that old library table or any other piece you think might be valuable, he suggests you hit the books. "Auction house catalogs give an idea of the style, age, and origin of a piece." Dominick also uses the *Lyle Price Guide to American Furniture,* by Anthony Curtis (Perigee Books), which tells how much similar items have sold for. Bear in mind, the age and origin of a piece can be elusive. "Unless the chair can talk to you and tell you where it was made, you may never know for sure," he advises.

Whether value comes from a price guide or memories of sitting in grandma's parlor, Dominick recommends a careful assessment before restoration begins. "The less work you have to do, the better off the piece is." That means leaving patina, and the little dings and dents that give the furniture character.

So what should you fix? Dominick says broken parts, including hardware and veneers, need to be repaired or replaced. Look for signs of previous

A fleet of vintage planes, *above*, lines the ceiling of Dominic's shop. While some are rare and collectible, most are used for replicating antique moldings.

restoration, especially around joints. He notes, "If somebody tried to tighten up a table leg by driving screws from behind, they may have done more damage than good." Deep water rings may require complete stripping.

On some pieces, you can get away with major restoration and not hurt the value, but you have to be careful. "When you get into a good Early American piece, you can lose half the value if you refinish it," he cautions. However, if an antique piece has a modern finish on it, such as a polyurethane, strip it and restore it.

In most cases Dominick can tell what kind of finish was used on a piece just by eyeballing it. When he's not certain, though, he uses a 3-part test. Starting with a little denatured alcohol on a cloth, he rubs the finish in a hidden area. A shellac finish will get gummy. If the surface doesn't soften, he repeats the test, this time using turpentine. A sticky finish now means a varnish. If neither solvent has softened the finish, he tries lacquer thinner. If the finish softens, it's lacquer.

Antique renewal begins with the hardware

Dominick's school of restoration abides by the three R's: remove the hardware, repair the wood, and renew the finish. He'll go to the fourth "R"—refinish—only if necessary, "I'd rather keep the old finish intact by cleaning it and polishing it back to its original color," he says.

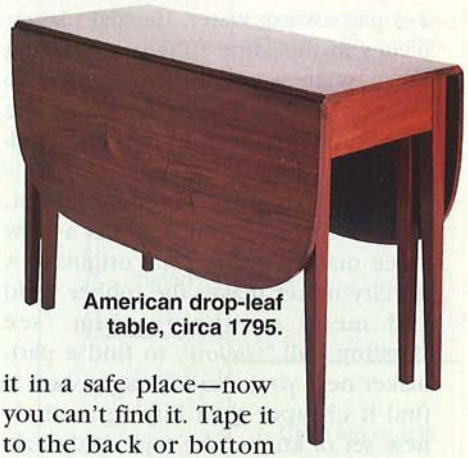
To begin, he carefully removes the hardware and mounts (metal decorations attached to the furniture) and notes the location of each piece by marking its back with a scribing tool. Even the screws must go back into the same holes. "Before they were mass-produced, screws had hand-cut threads so they can vary," he explains. "If you put a hand-cut screw in the wrong hole, it can cross the threads and damage the hole." To keep them in order, the restoration expert pushes the screws through a 3×5" index card showing their locations.

Dominick cleans small parts in an ultrasonic cleaner, as shown at *right*,

Continued

Dominick's Top 6 Antique Abuses

(or: "What NOT to Do to Your Antique.")



American drop-leaf table, circa 1795.

1 *Water and alcohol rings.*
Mom always nagged, "Use a coaster," and she was right. Today's polyurethanes stand up to moisture, but not so antique shellacs. Put a pan under the plant, too.

2 *Vacuum cleaner damage.*
See those worn areas on Grandma's buffet, about an inch above the floor? Your upright vacuum can scratch the finish, break off a pediment, or pop off veneer. Go gently.

3 *Oily wax buildup.*
Spray polishes put on a fast shine, but they also make it difficult to repair the finish if need be. Instead of spraying, every 6 months or so give the piece a nice coat of paste wax.

4 *Missing hardware.*
You never got around to putting that pull back on the drawer, so you put it in a safe place—now you can't find it. Tape it to the back or bottom of the piece. Maybe the person who buys it from you will do the work.

5 *Mishandling.*
The leaves of a drop-leaf dining table were made to carry plates and food, not the table itself. Lift the table by the fixed top or apron. Going by truck? Put down a furniture pad and transport it legs-up.

6 *Poor repairs and restoration.*
Resist the temptation to "quick fix" loose joints or damaged finishes. Do the job right the first time, and you'll likely not need to do it again.

An ultrasonic cleaner provides heat and agitation to clean hardware while you work on other things. Convenience has its price: Dominick paid about $600 for this toaster-size unit (available from McMaster-Carr, 630/833-0300, or online at www.mcmaster.com).

using a solution of 1 part ammonia to 2-3 parts warm water. He soaks larger pieces in the same solution, brushing them with a soft-bristle brush to loosen the soil. Finally, he rinses the hardware with clean water and towel-dries it to prevent spotting.

When faced with a missing mount, knob, or pull, Dominick has a new piece made to match the originals. A jewelry maker makes the rubber mold and metal casting for him (see "Casting Call," *below*, to find a part-maker near you). Isn't it expensive? "I find it cheaper than buying a whole new set of knobs," he says. And, making one new part rather than replacing them all fits with Dominick's credo of doing as little as necessary. Hardware and mounts go back on last, a few days after the finish on the piece dries.

Casting Call

If you'd like new parts cast and don't know where to go, call the American Foundrymen's Society at 800/537-4237. The communications department will gladly help you. Or you can search for a foundry using their Casting Source Directory online at www.castingsource.com.

Repairing water damage? Hold the mayo

One of the more common problems Dominick encounters is water damage, such as the nasty ring shown on the drop-leaf table at *right*. The owner tried to repair the finish by smearing in a mixture of mayonnaise and cigarette ashes. "She certainly did more harm than good," he says. Instead of folk remedies, first try to dry the ring out with a blow dryer on the "warm" setting.

If the damage has penetrated the finish, Dominick first removes the finish. He then scrubs the damaged area with a brush dipped in denatured alcohol or acetone, being careful not to remove too much of the wood's color. Water stains also can be bleached out. But, because this process removes the patina and can stain the piece, he considers it a last resort.

Like bad magic, a water stain that seems to be gone can reappear when the craftsman applies a finish. "Some rings never come out completely," he says. "Get the stain as light as you can, but if it comes back on you a little bit, just look at it as character," he grins.

Due to deep water damage, Dominick had to remove the finish of this American table to repair it. The restored piece is shown on the *previous page*.

Putting the best face on a piece

Dominick sees bubbled, broken, and missing veneers everyday in his shop. For example, the turn-of-the-century rosewood cabinet being repaired in the photo *opposite*, "was probably left outside in a barn where it was damp, and much of the veneer popped loose," he speculates. "Somebody tried to tape the veneer to keep it from falling off. But a good portion of the veneer was pretty much gone."

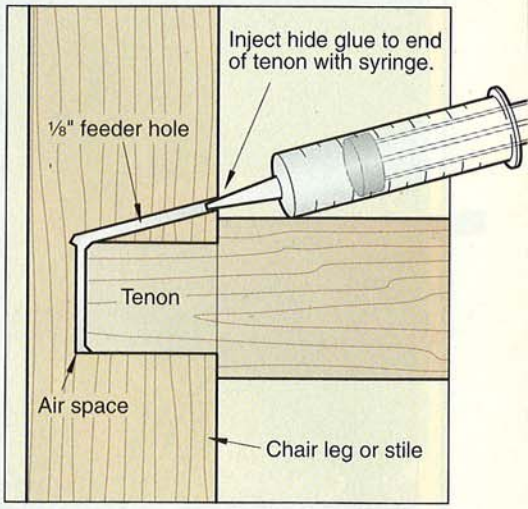
Still, Dominick repairs as little as he must, excising only the injured portions with a chisel or veneer punch, slicing with the grain. To fill the gaps, he takes a scrap of the old veneer to the hardwood store to match the color and grain. Because today's veneers are thinner (at about 1/40") than the veneers he replaces (which could be anywhere from 1/16 to 1/8"), he frequently resaws veneer from solid stock. "I'll usually cut several pieces to see which one looks best," he says.

Before gluing, he wets the new piece to get an idea of how it will look when finished. "Sometimes when you glue a piece in there, it looks great. Then, you apply the finish, and it's like: Where did I get *this* piece from?" Dominick uses hide glue, he says, "not to make the piece historically correct, but because repairs made with hide glue can be undone if need be."

Loose veneers are easy to find and fix. Dominick taps the veneer with his fingernail, and when the sound goes

Molten metal is injected into this rubber mold, made from an original part. The resulting duplicate part is slightly smaller than the original.

Dominick reactivates the hide glue under loose veneer with a damp cloth and an old iron. Note the newly replaced veneer on the left.



from solid to thin, he's found a loose spot. "I save it by heating up the glue underneath," he advises. He wets and wrings out a piece of clean cheesecloth folded to about 8 layers. Placing the damp cloth over the loose spot, he presses an old steam iron on the cloth for 5-10 seconds. "Once the iron hits the cloth, it's shooting steam through that veneer, softening the glue," he states. After removing both iron and cheesecloth, he rubs the veneer with a veneer hammer or rubber roller until the wood cools.

A shot in the leg cures joints

"Some people think they're doing good to a piece by driving screws and brackets into [loose joints]," laments the artisan, "but there's a tremendous amount of damage done." Dominick's mantra of joint repair is disassemble, clean, and reglue. That's fine for parts that wobble on both ends, but what if disassembling the bad joint means weakening another joint? He advises, "I wouldn't separate the joint completely, I'd just loosen it enough to get glue in behind it."

To accomplish this, Dominick first softens the old glue by injecting a little warm water around the joint, letting it stand for awhile. He then drills a ⅛" "feeder" hole into the bottom of the mortise as shown in the drawing *above right.* "I know I've hit the gap when the drill gives just a bit," he says.

Using a syringe, Dominick injects hide glue into the feeder hole and clamps the joint. Some places, such as where rails meet at a chair leg, share the ends of the mortises. In this case, one shot strengthens both joints.

Renew if you can; refinish only if you must

After completing repairs, Dominick's first choice is to restore, rather than refinish. He starts by washing the entire piece with #0000 steel wool dipped in naphtha, which deep-cleans the old finish. If a non-shellac finish is extremely soiled, he sands lightly with 600-grit wet sandpaper. After wiping with a tack rag, he French-polishes the piece using a padding lacquer.

Because removing the old finish also strips much of the piece's charm and beauty, Dominick does it only as a last resort. He begins with a wax-free stripper (most stripping solvents contain carnauba wax that keeps the chemical penetrating into the wood). "I don't want to go deep into the pores, I just want to remove the varnish on the surface," he says. To prevent damage to the wood when removing the finish, he gently scrapes it off with a modified putty knife; a radius ground on each corner keeps it from gouging.

After scraping, he washes the entire piece—including new veneer—with a 2:1 solution of wash thinner (low-grade lacquer thinner) and denatured alcohol. On a varnish finish, he uses naphtha instead of alcohol. This removes the stripper's residue and spreads the color of the original finish over the entire piece to help new and old veneer blend.

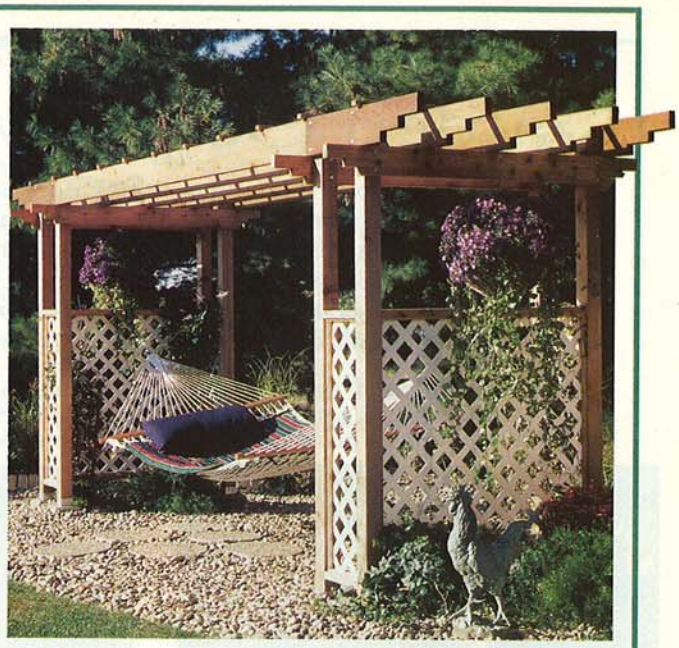
When the piece is dry, Dominick wipes it with denatured alcohol. Then, using a badger or sable brush, he brushes on a 50 percent cut of shellac, followed by a French polish. His restoration, at last, is complete.

Restored settee and chair set, probably Biedermeier, circa 1845.

Written by Dave Campbell Photographs: John Kane Illustration: Kim Downing

Garden Getaway

Swing a bit (or catch a snooze) at our relaxation station



For pure relaxation, nothing beats a garden swing—except, perhaps, a hammock. Pick your favorite; you can build our arbor to provide your preferred brand of comfort.

Note: *The end assemblies are identical for the swing arbor, shown at* left, *and the hammock arbor,* above right. *The only difference between the arbors is in the length of the rafters. The swing shown* left *is from* WOOD PLANS® *WP-OFS-1002. To order the $9.95 plan, call 800/572-9350.*

Start out on solid footings

1 Lay out the locations for the eight post footings. The drawing *below* shows where to put the footings for the swing arbor. For the hammock arbor, change the 5' 9½" center-to-center distance shown on the drawing to 12' 8½".

2 Dig holes, and pour the concrete footings, taking care to level and align them. Incorporate provisions for attaching 4×4 posts to the footings. (See *What Woodworkers Need to Know* in this issue for more information on anchoring outdoor projects.)

Put posts and rails together to get the project underway

1 Cut the 4×4 posts (A) and 2×4 rails (B, C) to the lengths specified in the Bill of Materials.

2 Mark the locations of the side rails (B) and the end rails (C) on the posts. (See the drawing on the *next page*.)

3 Drill two pocket holes in the underside of each end of each rail (B, C). Set the pocket-hole jig back 1" from

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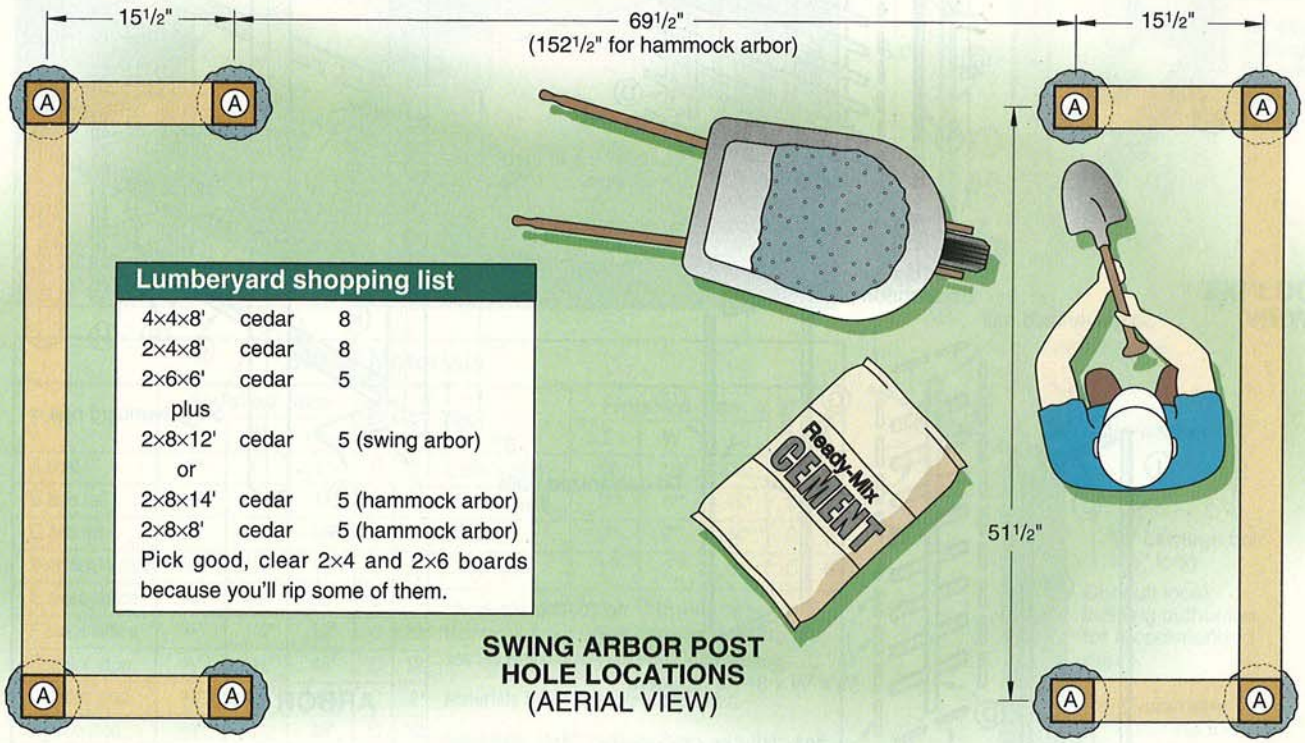


Lumberyard shopping list

4×4×8'	cedar	8
2×4×8'	cedar	8
2×6×6'	cedar	5
plus		
2×8×12'	cedar	5 (swing arbor)
or		
2×8×14'	cedar	5 (hammock arbor)
2×8×8'	cedar	5 (hammock arbor)

Pick good, clear 2×4 and 2×6 boards because you'll rip some of them.

SWING ARBOR POST HOLE LOCATIONS
(AERIAL VIEW)

Garden Getaway

the end as shown *below*. This centers the screw on the end of the 2×4 rail, allowing the use of longer screws.

4 Assemble two posts and two side rails (B) with screws, as shown in the Arbor End drawing. (We drove a 3½"-long deck screw into each pocket-hole.) To make assembly easier, brace the rail against a handscrew clamped to the post, and clamp it in position, as shown *below*. Construct three more A/B assemblies this way.

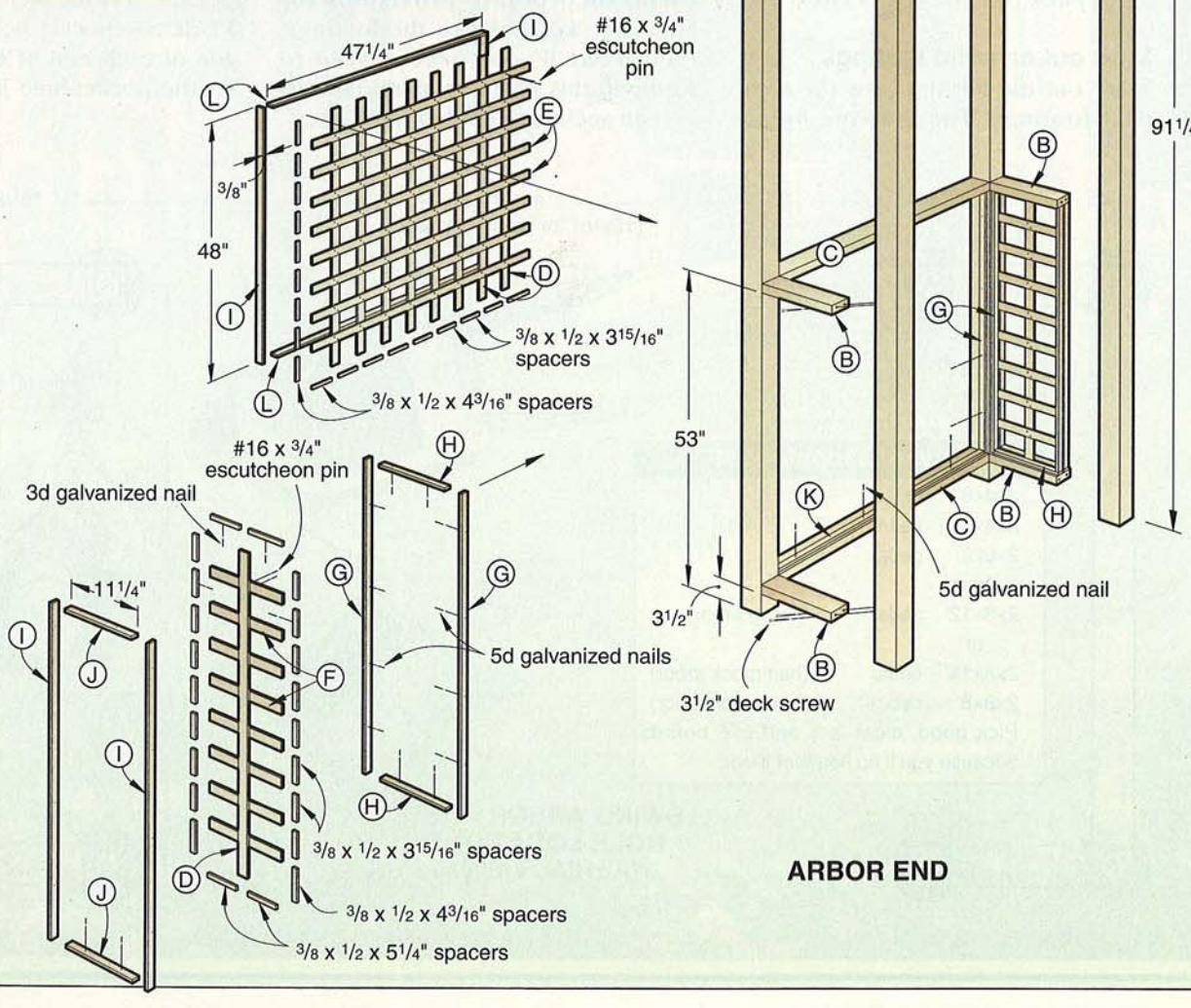
A piece of scrapwood 1" wide (painted yellow here) serves as a spacer when drilling the rails with the pocket-hole jig.

A handscrew and a bar clamp help hold the rail (B) in position when attaching it to the post (A).

5 Rip ⅜" strips for the lattice (D, E, F) from the 2×4 stock. The thickness of the 2×4 yields the proper width for the strips. Cut the lattice to length.

6 Rip more 2×4 stock to ⅜" for the lattice stops (G, H, I, J, K, L). Rip and crosscut the resulting ⅜×1½" stock to the dimensions shown for the stops.

7 Rip and crosscut enough stock for the spacers shown on the Arbor End drawing. You'll need 112 of the 3 15/16"-long spacers, 32 of the 4 3/16"-long ones, and 16 of the 5¼"-long pieces. Stack the stock, and cut several stops at a time to speed the job.



ARBOR END

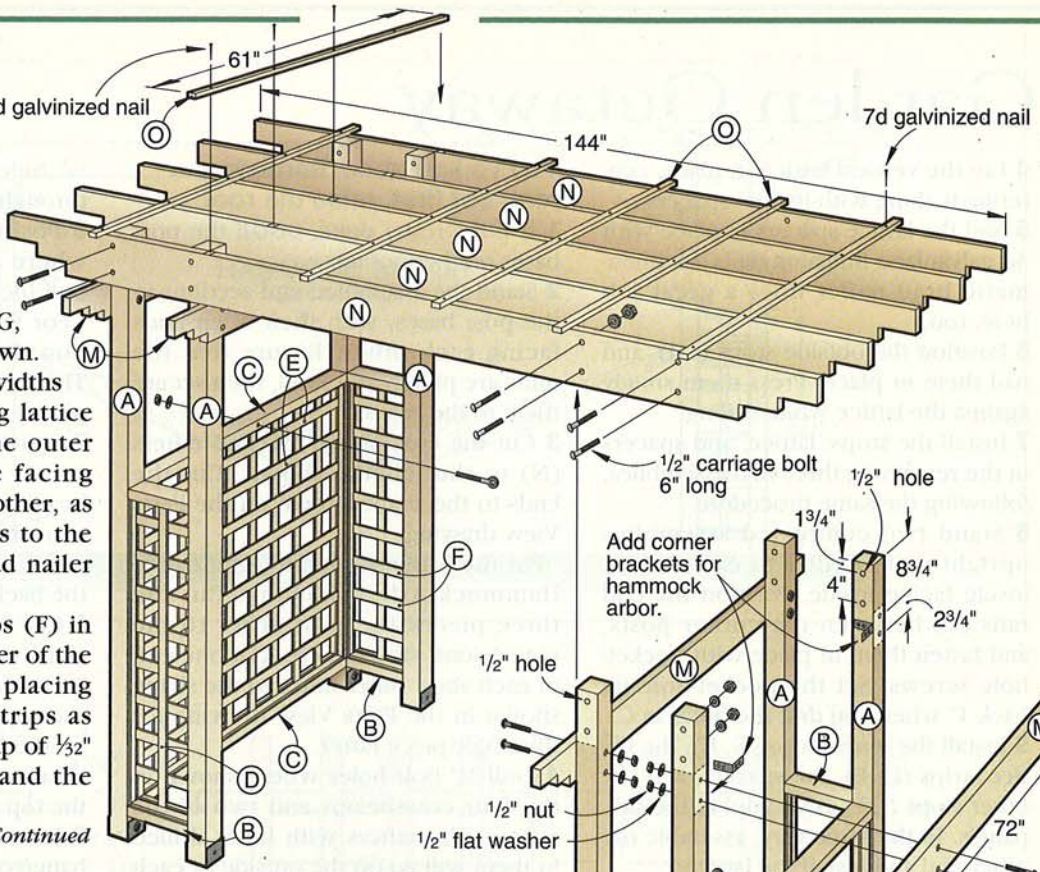
Now, build a pair of arbor ends

1 Lay one post-and-rail assembly (A, B) flat on sawhorses, outside facing up.

2 Position the inside stops (G, H) in the opening where shown. The stops are two different widths to allow for the overlapping lattice slats. Place the stops so the outer edges of the stops (those facing down) are flush with each other, as shown *below*. Nail the stops to the posts (A). (A pneumatic brad nailer speeds this task.)

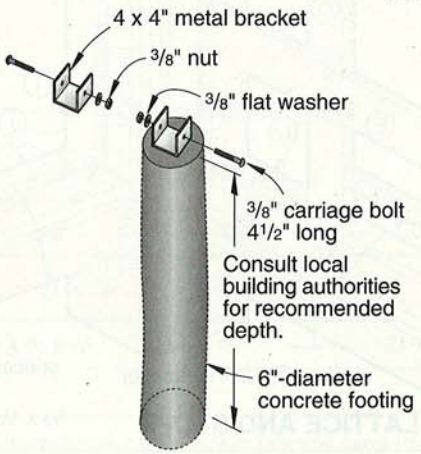
3 Lay the cross lattice strips (F) in position. Work from the center of the opening toward each end, placing the spacers between the strips as shown. (You should find a gap of 1/32" between the 4 3/16" spacers and the ends of the opening.)

Continued



The inner faces of the stops are offset by 3/8" to accommodate the overlapping lattice strips.

EXPLODED VIEW


4 x 4" metal bracket
3/8" nut
3/8" flat washer
3/8" carriage bolt 4 1/2" long
Consult local building authorities for recommended depth.
6"-diameter concrete footing

Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.	Part	Finished Size T	W	L	Matl.	Qty.
A post	4"*	4"*	91¼"	C	8	L lattice stop	3/8"	1 3/8"	47½"	C	4
B side rail	2"*	4"*	12"	C	8	M crossbeam	2"*	6"*	72"	C	4
C end rail	2"*	4"*	48"	C	4	N rafter	2"*	8"*	144"**	C	5
D vertical lattice	3/8"	1½"	48"	C	20	O top cleat	1"*	2"*	61"	C	6
E cross lattice	3/8"	1½"	48"	C	16						
F cross lattice	3/8"	1½"	12"	C	32						
G lattice stop	3/8"	1 3/8"	48"	C	12						
H lattice stop	3/8"	1"	11¼"	C	8						
I lattice stop	3/8"	1"	48"	C	12						
J lattice stop	3/8"	1 3/8"	11¼"	C	8						
K lattice stop	3/8"	1"	47½"	C	4						

*Nominal dimension **Swing arbor only. Hammock Arbor rafters comprise three sections; see the Hammock Arbor Front View drawing.

Materials Key: C–western red cedar.

Supplies: ½×6" carriage bolts with nuts and washers, 3½" deck screws 5d, 7d galvanized nails, #16×¾" escutcheon pins, anchors.

Garden Getaway

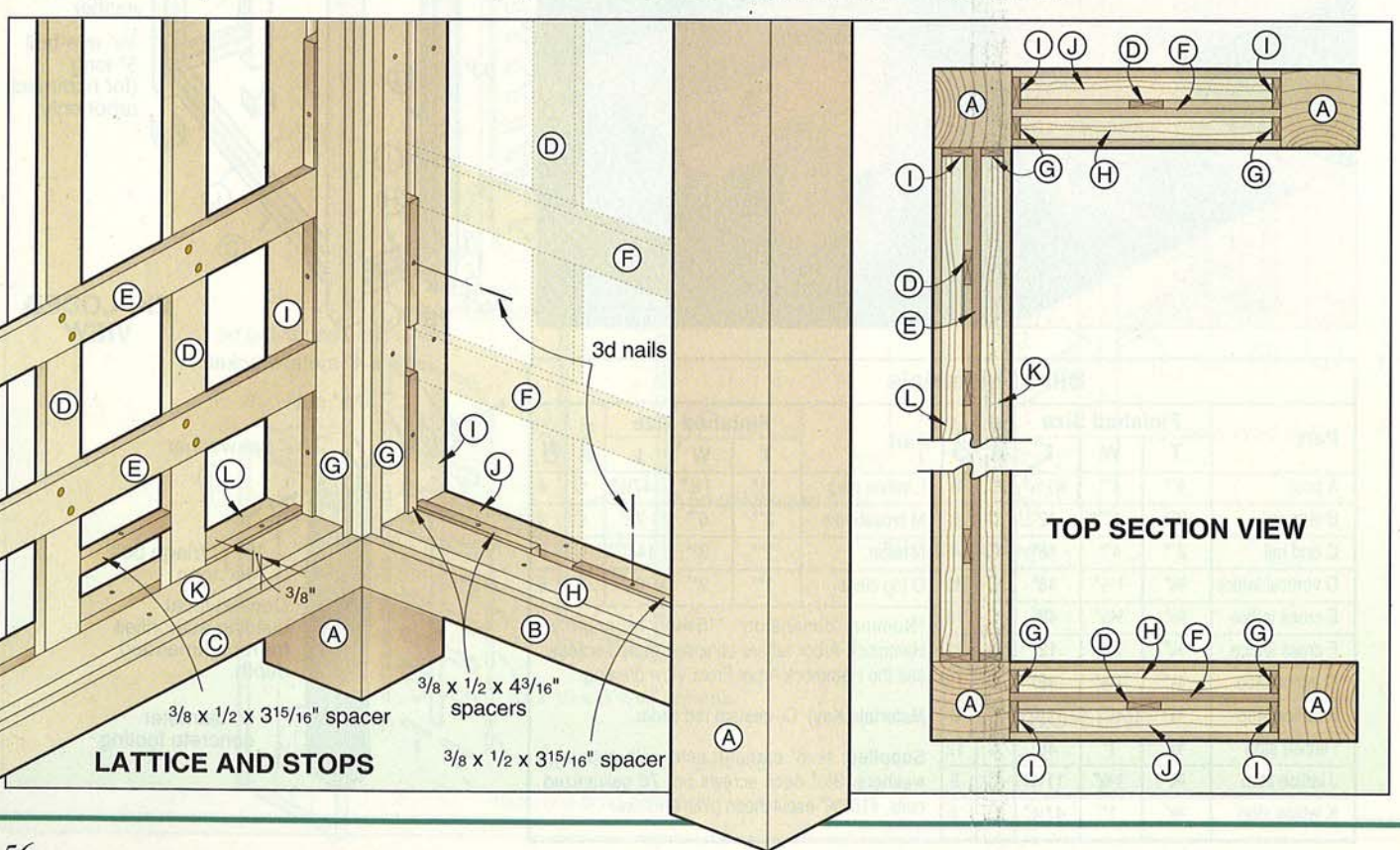
4 Lay the vertical lattice in place, centering it along with its 5¼" spacers.
5 Nail the lattice spacers in place with 3d galvanized finishing nails. (A pneumatic brad nailer does a great job here, too.)
6 Position the outside stops (I, J), and nail them in place. Press them snugly against the lattice while nailing.
7 Install the stops, lattice, and spacers in the remaining three A/B assemblies, following the same procedure.
8 Stand two completed assemblies upright and parallel to each other, inside facing inside. Position the end rails (C) between the corner posts, and fasten them in place with pocket-hole screws. Set the pocket-hole jig back 1" when you drill the holes in C.
9 Install the inner stops (G, K), the lattice strips (D, E), the spacers, and the outer stops (I, L) as you did in the side panels. In the same way, assemble the other end and install the lattice.
10 Where the lattice strips cross, nail them together with #16×¾" escutcheon pins. Drive the pins from the inside while holding the head of another hammer or a heavy piece of metal against the joint on the outside.

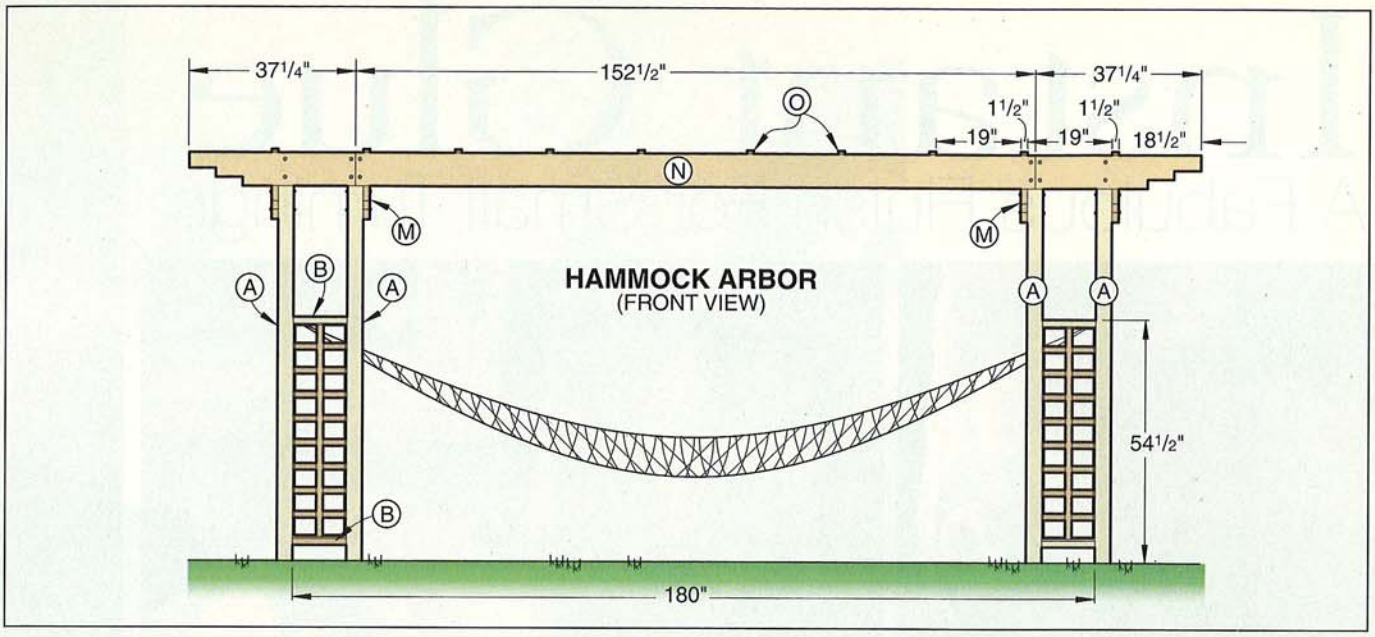
You've just about earned your rest; but first, raise the roof

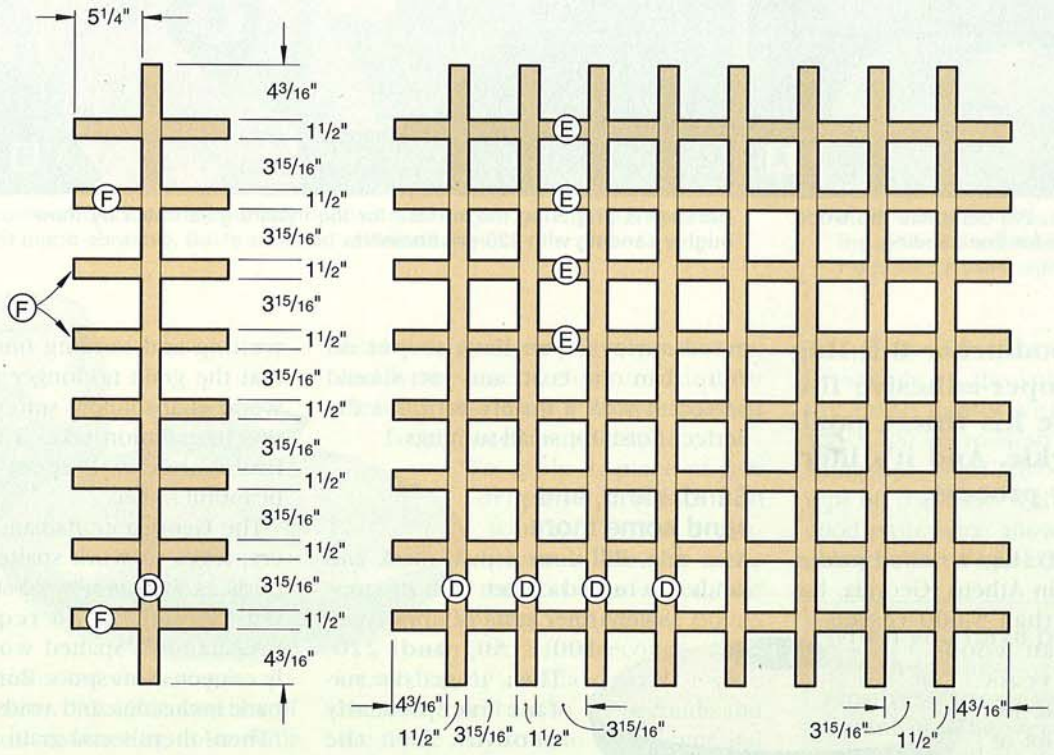
1 If not already done, install the post bases on the footings.
2 Stand the assembled end sections in the post bases, with their open ends facing each other. Ensure that the units are plumb and level, then secure them to the bases.
3 Cut the crossbeams (M) and rafters (N) to the lengths shown. Cut the ends to the shape shown on the Parts View drawing.

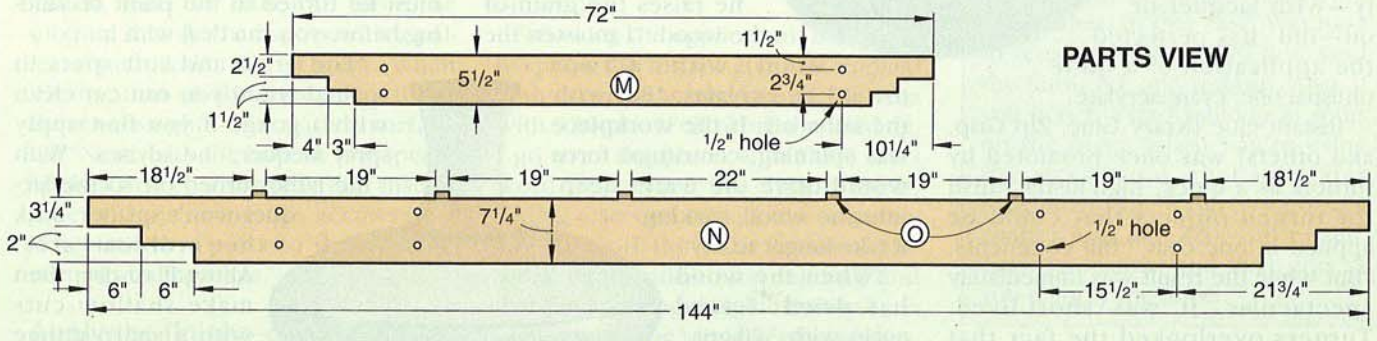
For the hammock arbor, refer to the Hammock Arbor drawing. Cut the three pieces for each rafter to the dimensions shown there. Cut one end of each short outer rafter to the shape shown in the Parts View drawing for the single-piece rafter.
4 Drill ½" bolt holes where shown in the four crossbeams and two of the rafters. The rafters with holes drilled in them will go on the outside of each arbor end, as shown in the Exploded View drawing.
5 Position the crossbeams (M) where shown on the posts (A). Make sure they're level and aligned across the tops; then clamp them in place. Drill ½" holes through the posts, guiding through the holes in the crossbeams.
6 Position the two outer rafters (N) where shown. Drill bolt holes, and bolt the rafters to the posts.

For the hammock arbor, first position the long central rafter section. Then, install the two ornamental end pieces on each rafter.
7 Space the remaining three rafters evenly across the top of the crossbeams as shown. Toenail them to the crossbeams, or attach them with screws in pocket-holes, drilled from the back side.
8 Cut the top cleats (O) to the dimensions shown. (We cut them from the remaining 2×6.) Position them across the tops of the rafters where shown on the Parts View drawing. Attach the cleats with screws, driving one into the top of each rafter.
9 Install the necessary hardware to hang your swing or hammock. For the hammock arbor, drill holes in the top end rails (C) where shown, and install ⅜" eyebolts through them. For additional strength, install heavy steel corner brackets between rails B and C on the inside.







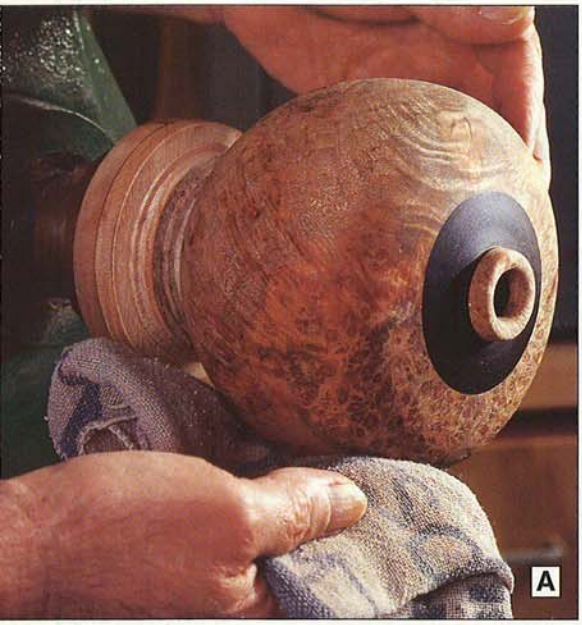


PARTS VIEW

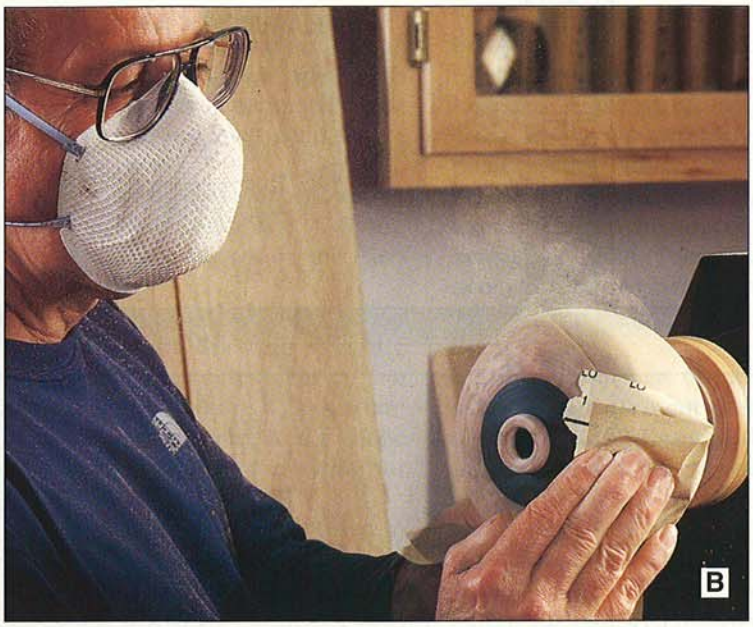
Project Design: James R. Downing Photographs: Marty Baldwin; Hetherington Photography Illustrations: Roxanne LeMoine; Kim Downing; Lorna Johnson

Instant Glue

A Fabulous Finish For Small Turnings



With a wet cloth, Bill dampens the wood to raise the grain for fine sanding.



Bill begins preparing the surface for the instant-glue finish by thoroughly sanding with 320-grit abrasive.

Georgia woodturner Bill Hug applies a super-adhesive finish to make his finest small pieces sparkle. And it's literally a sticky process.

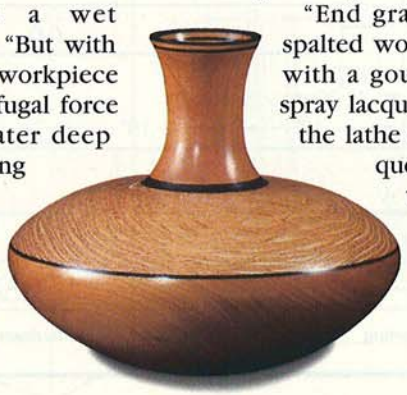
William E. (Bill) Hug, a retired professor of botany in Athens, Georgia, has turned more than 5,000 vessels since he began woodturning 16 years ago. And while he has finished a lot of his work traditionally—with lacquer or oil—Bill has perfected the application of a quite unusual one: cyanoacrylate.

"Instant glue [Krazy Glue, Zip Grip, and others] was once promoted by turners as a quick, high-luster finish for turned objects that could be applied in one coat," Bill comments. "But while the result was immediately spectacular, it was short-lived. Turners overlooked the fact that instant glue, like most good finishes, has to be applied to a carefully prepared surface, you have to put on more than one coat, and you should protect it with a quality wax. It's the perfect finish for small turnings."

Sand, sand, and sand some more

As a rule, Bill dons a dust mask and sands the turned object with progressively finer grits of abrasive—100, 150, and 220. Then, to get the surface exceptionally smooth for the cyanoacrylate finish, he raises the grain of the wood. "I moisten the wood with a wet towel," he explains. "But with the lathe off. If the workpiece was spinning, centrifugal force would drive the water deep into the wood, making it take longer to dry.

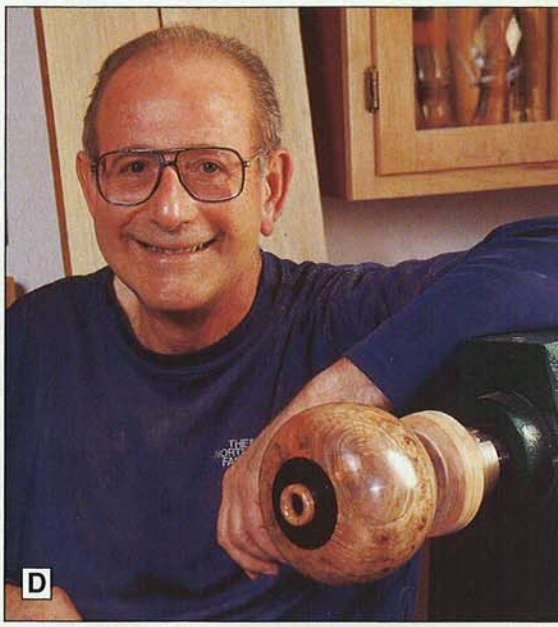
"When the wood has dried, I sand again with 320-grit," the turner continues. "Then, I repeat the wetting and sanding until I can feel that the grain no longer rises and the wood is absolutely smooth. While all this preparation takes a lot of time, I find it time well spent in getting a beautiful finish."



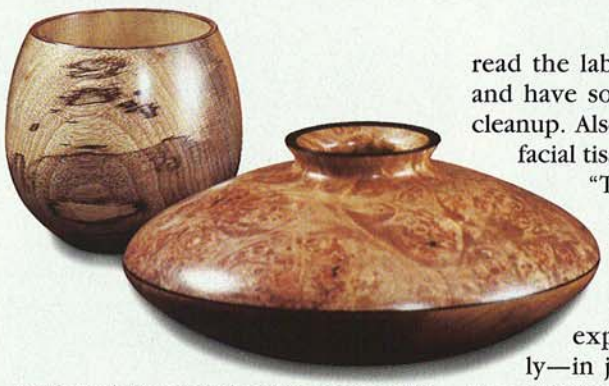
The Georgia craftsman, like all turners, loves to work spalted wood and burls as well as normal stock. But finishing such wood requires extra preparation. "Spalted wood commonly contains soft spots. Burls often have bark inclusions and voids," notes Bill. "Then, there's end grain to deal with. But no matter the problem, the pieces must be turned to the point of sanding before you can deal with it.

"End grain and soft spots in spalted wood you can cut clean with a gouge if you first apply spray lacquer," he advises. "With the lathe turned off so the lacquer won't splatter, soak the problem area. Allow it to dry, then make shallow cuts with a sharp gouge until the area becomes smooth."

After three coats of quickly and carefully applied instant glue, plus a final sanding with 3,200-grit micro abrasive, Bill is satisfied with the finish.



Multi-coats of instant glue and micro-sanding give Bill's turnings a high-gloss finish. He protects them with wax, too.



Bark inclusions and voids require different treatment. "Mix fine sawdust of the same or a contrasting color with white woodworking glue," Bills says. "Then, with the lathe off, force the mixture into the bad spots with a pallet or putty knife and let it dry. When it's dry, turn on the lathe and remove the excess glue mix with a surface cut. Next, with the lathe at low speed, apply a first coat of water-thin instant glue without using the accelerator. When it's dry, proceed through the normal sanding steps."

Apply the finish—carefully

"Instant glue must be carefully handled," cautions Bill. "First, be sure to read the label, wear eye protection, and have some acetone on hand for cleanup. Also, have a good amount of facial tissue for application.

"To apply it, place of few drops on a tissue and touch it to the workpiece while the lathe turns at slow speed," he explains. "And do it quickly—in just a few seconds. Then immediately discard the tissue because it will set in 4-5 seconds and the tissue may stick to your finger and burn the skin, stick to the workpiece, or both!"

Following the application, Bill quickly sprays the instant glue just applied with accelerator, then sands the area with 320-grit. "Following the sanding, I go over the piece with 0000 steel wool to remove the dust prior to adding a second coat. And I occasionally turn off the lathe to see if the work needs additional sanding and that I'm applying the glue evenly."

Bill repeats the sanding, glue application with accelerator, and steel wooling two more times, progressing from 320-grit to 400, then 600 grit. Finally, he speeds up the lathe and polishes the finish lightly with 2,400, 2,600, and 3,200 Micro-Mesh abrasives (from Klingspor, 800/228-0000). Then, he tops off the finish with a thin coat of a good paste wax, allows it to dry, and gives the piece a final buffing.

When you have problems

"Open-grained wood usually requires two or more coats of instant glue between sandings to completely fill up the pores," says Bill. "Another problem is uneven application. In that case, you have to return to 320 or 220 grit, sand the finish off, and refinish. Also, if you notice a dust buildup in spots on the piece when you're using the steel wool, that indicates roughness. You'll have to go to a coarser grit, like 220, and resand. Then go to finer and finer grits as you reapply the finish."

Written by Peter J. Stephano
with William E. Hug
Photographs: Hetherington Photography

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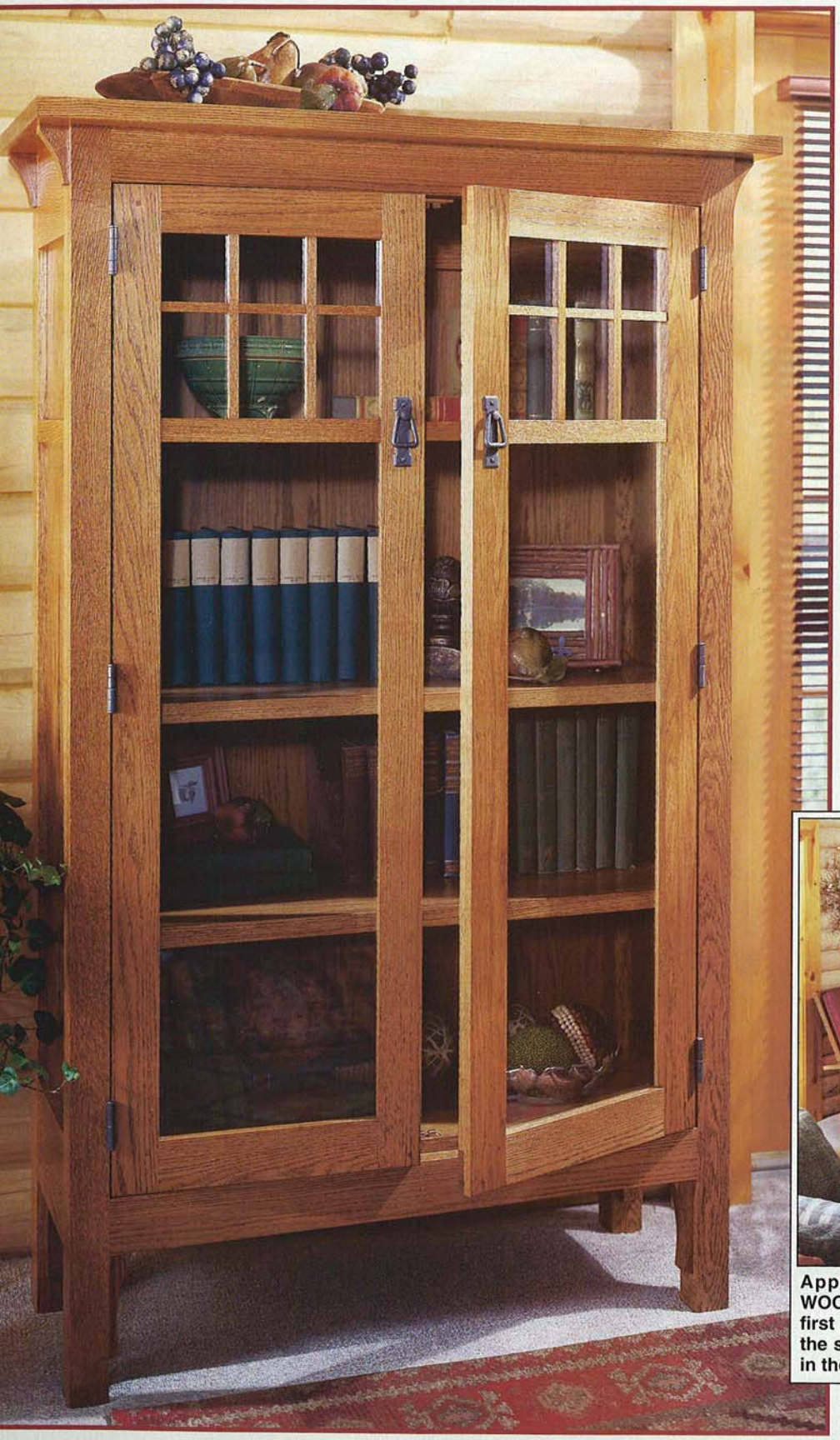
Arts-and-Crafts Bookcase

Simple, yet stunningly elegant



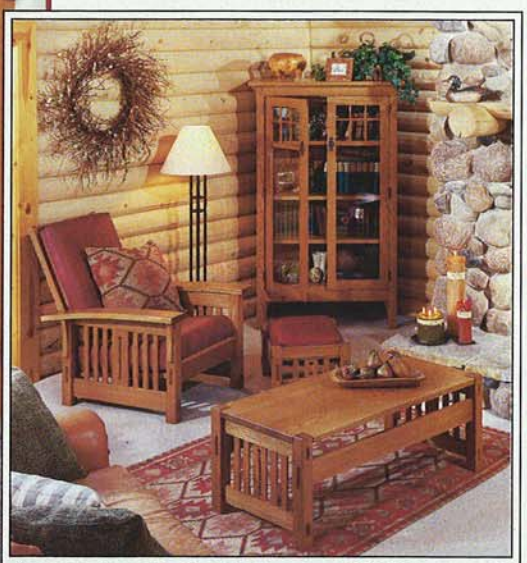
Hopefully, we've enticed you to build one or more of our mission-style furniture pieces in previous issues of WOOD® and shown *below*. Now, add to the set with this stately bookcase. We embellished ours with cutouts in the side panels, reproduction hardware, and glass-framed doors to capture the quality and ambience of furniture from this era of craftsmen.

Let's start by laminating and machining the legs

1 To form the 2⅛"-square legs (A), cut 8 pieces of 1⅛" stock to 2¼" by 68". (Using these dimensions, the pieces are ⅛" oversized in width and 1" in length so you can trim flush the edges and ends of the laminated legs later.) See the Legs drawing for reference.

2 Spread an even coat of glue on the mating surfaces of two pieces making up each leg. With the edges and ends flush, glue and clamp the pieces face-to-face to form the front and rear legs.

3 Cut or plane an equal amount off both edges of each leg for a 2⅛" fin-



Appearing in the February 1999 issue of WOOD®, the Morris chair shown *above* was the first in a series of mission pieces. Continuing the set, the ottoman and coffee table appeared in the March 1999 issue.

ished width. Then, trim both ends of each leg (A) for a 67" finished length.

4 Using the Legs drawing for reference, lay out the mortises and grooves on each leg where dimensioned. Note the location of the joint lines when marking the mortises and grooves, and be sure the right and left legs are mirror images.

5 Attach a fence to your drill-press table. Using a 7/16" brad-point bit, drill holes inside the marked mortise outlines. Then square-up the mortises with a chisel.

6 Working from the top end down, mark the location of the shelf-hole centerpoints. The center of the top hole must be 16" from the leg tops so the top shelf will be hidden behind the door rails (T) later. Drill a ¼" hole ½" deep at each marked centerpoint. (As shown in *Photo A*, we used a scrap strip of pegboard as a guide when drilling the holes. The holes in the pegboard are exactly 1" apart. Notice that after drilling the first hole, we slid a ¼" piece of dowel through the pegboard into the leg to help ensure the pegboard wouldn't move on the leg.)

7 Mount a ¼" dado blade into your tablesaw, and cut a ¼" groove ¼" deep along the edges of each leg where marked, or use a ¼" slot cutter in your router fitted with a fence.

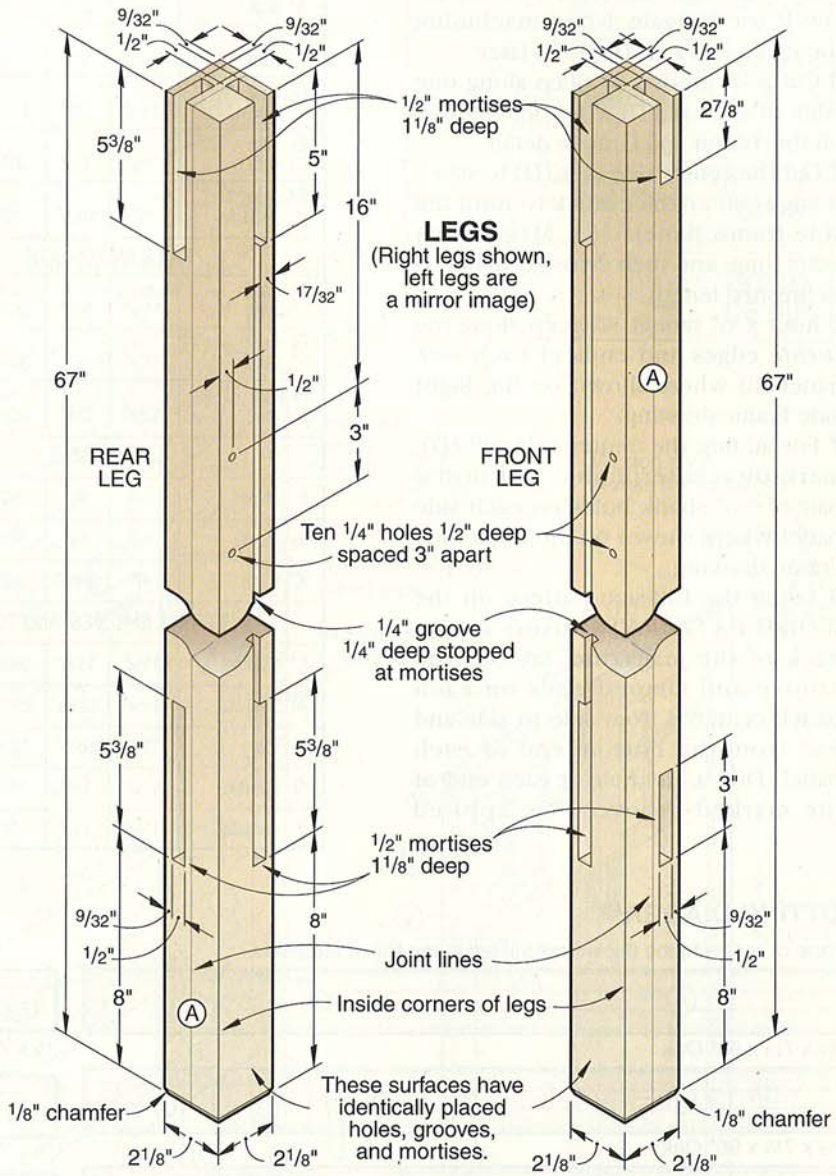
8 Rout ⅛" chamfers along the bottom end of each leg.

Machine and assemble the side frames

1 Cut the lower side rails (B) and the top rails (C) to the sizes listed in the Bill of Materials.

2 Using the Right Side Frame drawing and accompanying detail for reference, cut tenons on the ends of the rails to fit snug inside the leg mortises. To do this, fit your tablesaw with a dado blade, and attach a long wooden extension to your tablesaw's miter gauge. Square the extension to the blade. Using a stop for consistency, cut rabbets to form tenons on the ends of the rails. (We test-cut scrap stock first to ensure a tight fit of the tenons into the leg mortises.) Keep

Continued



Using a piece of pegboard, tape off the holes that won't be used, and use the remaining holes as guides to drill the holes in the legs for the shelf-support pins.

Bookcase

the long extension on the fence; you'll use it again when machining the tenons on rails (F, G, H) later.

3 Cut a ¼" groove ¼" deep along one edge of each rail (B, C) where shown on the Tenon and Groove detail.

4 Cut the center side rails (D) to size.

5 Edge-join ½"-thick stock to form the side-frame panels (E). Make them extra long, and then crosscut the ends to finished length.

6 Rout a ½" rabbet ¼" deep along the *inside* edges and ends of each side panel (E) where shown on the Right Side Frame drawing.

7 For adding the center side rail (D), mark the centerpoints, and drill a pair of 9/64" shank holes on each side panel where shown on the Right Side Frame drawing.

8 Using the full-size pattern on the *WOOD PATTERNS®* insert in the back of the magazine, lay out the groove and shaped ends on each panel, centered from side to side and 6¼" from the bottom end of each panel. Drill a 5/16" hole at each end of the marked groove. (We applied

Continued

Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
SIDE FRAMES					
A* legs	2⅛"	2⅛"	67"	LO	4
B side rails	1 1/16"	5⅞"	11⅞"	O	2
C side rails	1 1/16"	5½"	11⅞"	O	2
D side rails	17/32"	1¼"	9¾"	O	2
E* side panels	½"	10⅛"	48"	EO	2
RAILS AND CLEATS					
F back rails	1 1/16"	5⅞"	36¼"	O	2
G front rails	1 1/16"	3"	36¼"	O	1
H front rails	1 1/16"	2⅞"	36¼"	O	1
SIDE FRAMES					
I cleats	¾"	¾"	34"	O	3
J cleats	¾"	¾"	9⅝"	O	4
K back	¼"	34⅞"	48"	OP	1
BOTTOM, SHELVES, AND TOP					
L* bottom	1 1/16"	11⅝"	36⅛"	EO	1
M* shelves	1 1/16"	12 7/16"	35 15/16"	EO	3
N* top	1 1/16"	16¼"	42⅜"	EO	1
O corbels	1 1/16"	1⅜"	5¾"	O	6
P corbels	1 1/16"	1½"	3"	O	4

Part	Finished Size T	W	L	Matl.	Qty.
DOORS					
Q stiles	1 1/16"	2½"	53"	O	4
R rails	1 1/16"	2½"	17"	O	2
S rails	1 1/16"	2¾"	17"	O	2
T rails	½"	1¼"	12½"	O	2
U mullions	½"	½"	12½"	O	2
V mullions	½"	½"	10¼"	O	4
W glass stops	⅜"	⅜"	48¾"	O	4
X glass stops	⅜"	⅜"	13"	O	4
Y stop	¾"	2⅜"	4½"	O	1

*Cut parts marked with an * oversized. Trim to finished size according to the how-to instructions.

Materials Key: LO–laminated oak, O–Oak, EO–edge-joined oak, OP–oak plywood.

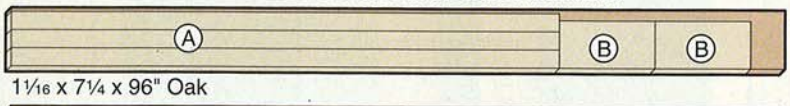
Supplies: #8×1½" flathead wood screws, #8×1½" roundhead wood screws with washers, #6×¾" flathead wood screws, 2 pieces of 12⅞×48⅝" double-strength glass, ¾"×18 brads, stain, finish.

Buying Guide

Hardware. 2 Mission style vertical door pulls (#123876), 3 pair of barrel hinges (#123872), 12 bracket style shelf pins (#27I16), 4 adjustable brass ball catches (#27H39), ¼" oak dowel stock (#50A01). For current prices, contact Woodcraft, 210 Wood County Industrial Park, P.O. Box 1686, Parkersburg, WV 26102-1686 or call 800/225-1153 to order.

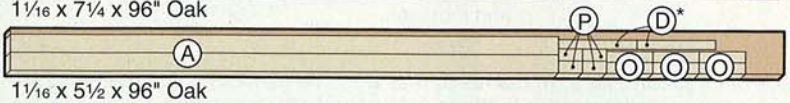
CUTTING DIAGRAM

*Plane or resaw to the thicknesses listed in the Bill of Materials.



1 1/16 x 7¼ x 96" Oak

1 1/16 x 7¼ x 96" Oak



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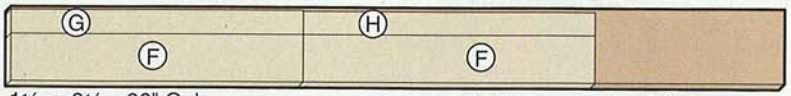
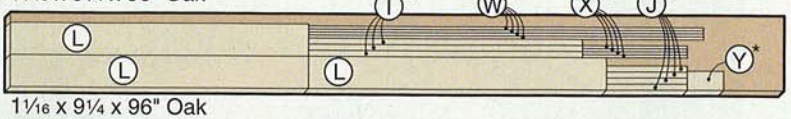
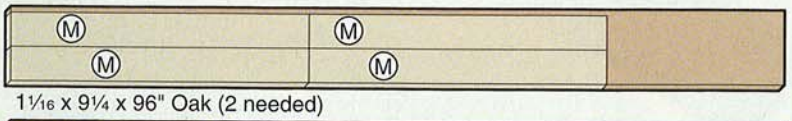


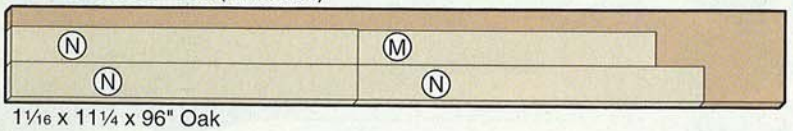
1 1/16 x 9¼ x 96" Oak



1 1/16 x 9¼ x 96" Oak

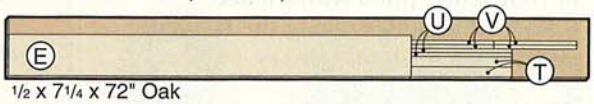


1 1/16 x 9¼ x 96" Oak (2 needed)

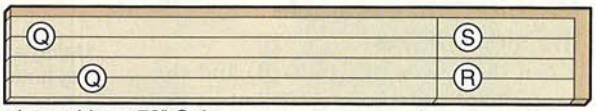


1 1/16 x 11¼ x 96" Oak

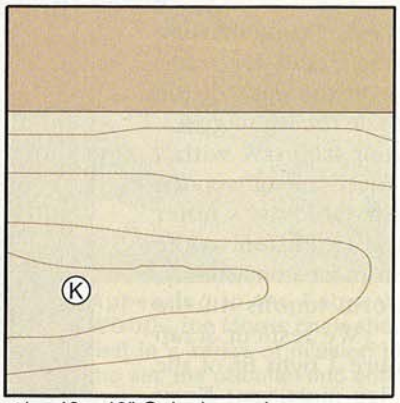
½ x 7¼ x 72" Oak (3 needed)



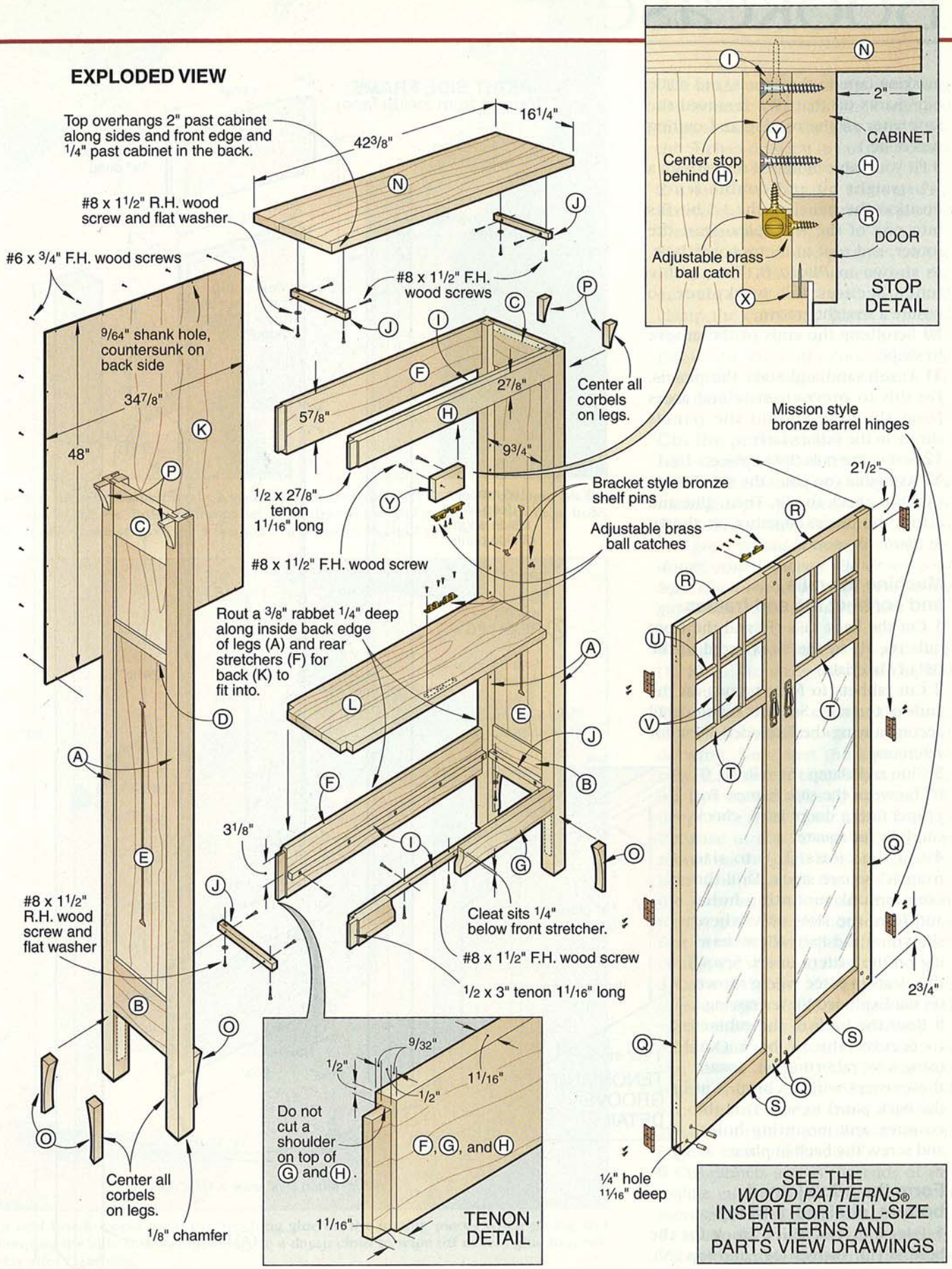
½ x 7¼ x 72" Oak



1 1/16 x 11¼ x 72" Oak



¼ x 48 x 48" Oak plywood


EXPLODED VIEW
Top overhangs 2" past cabinet along sides and front edge and 1/4" past cabinet in the back.
16 1/4"
42 3/8"
#8 x 1 1/2" R.H. wood screw and flat washer
#6 x 3/4" F.H. wood screws
#8 x 1 1/2" F.H. wood screws
9/64" shank hole, countersunk on back side
34 7/8"
48"
5 7/8"
2 7/8"
9 3/4"
Center all corbels on legs.
1/2 x 2 7/8" tenon 1 1/16" long
#8 x 1 1/2" F.H. wood screw
Bracket style bronze shelf pins
Adjustable brass ball catches
Rout a 3/8" rabbet 1/4" deep along inside back edge of legs (A) and rear stretchers (F) for back (K) to fit into.
3 1/8"
Cleat sits 1/4" below front stretcher.
#8 x 1 1/2" F.H. wood screw
1/2 x 3" tenon 1 1/16" long
#8 x 1 1/2" R.H. wood screw and flat washer
Center all corbels on legs.
1/8" chamfer
Mission style bronze barrel hinges
2 1/2"
2 3/4"
1/4" hole 1 1/16" deep
Do not cut a shoulder on top of (G) and (H).
9/32"
1/2"
1/2"
1 1/16"
(F), (G), and (H)
1 1/16"
TENON DETAIL
2"
CABINET
Center stop behind (H).
DOOR
Adjustable brass ball catch
STOP DETAIL
SEE THE WOOD PATTERNS® INSERT FOR FULL-SIZE PATTERNS AND PARTS VIEW DRAWINGS

masking tape to the panels, and made our marks on that. We removed the tape after all the routing and cutting was done.)

9 Fit your table-mounted router with a ¼" straight bit and double fence. Position the panel so the ¼" bit fits into one of the 5/16" holes. Start the router, and rout to the opposite hole, as shown in *Photo B*. The double fence secures the workpiece to ensure a straight groove.

10 Scrollsaw the ends of the groove to shape.

11 Finish-sand and stain the panels. Do this to prevent unstained areas from showing should the panels shrink in the frames later.

12 Screw the rails (D) in place.

13 Assemble (no glue) the side frames (A–E) to check the fit. Then, glue and clamp the pieces together, as shown in *Photo C*.

Machine the rails, and connect the end frames

1 Cut the back rails (F) and the front rails (G, H) to the sizes listed in the Bill of Materials.

2 Cut rabbets to form tenons on the ends of the rails. See the Tenon detail accompanying the Exploded View for reference.

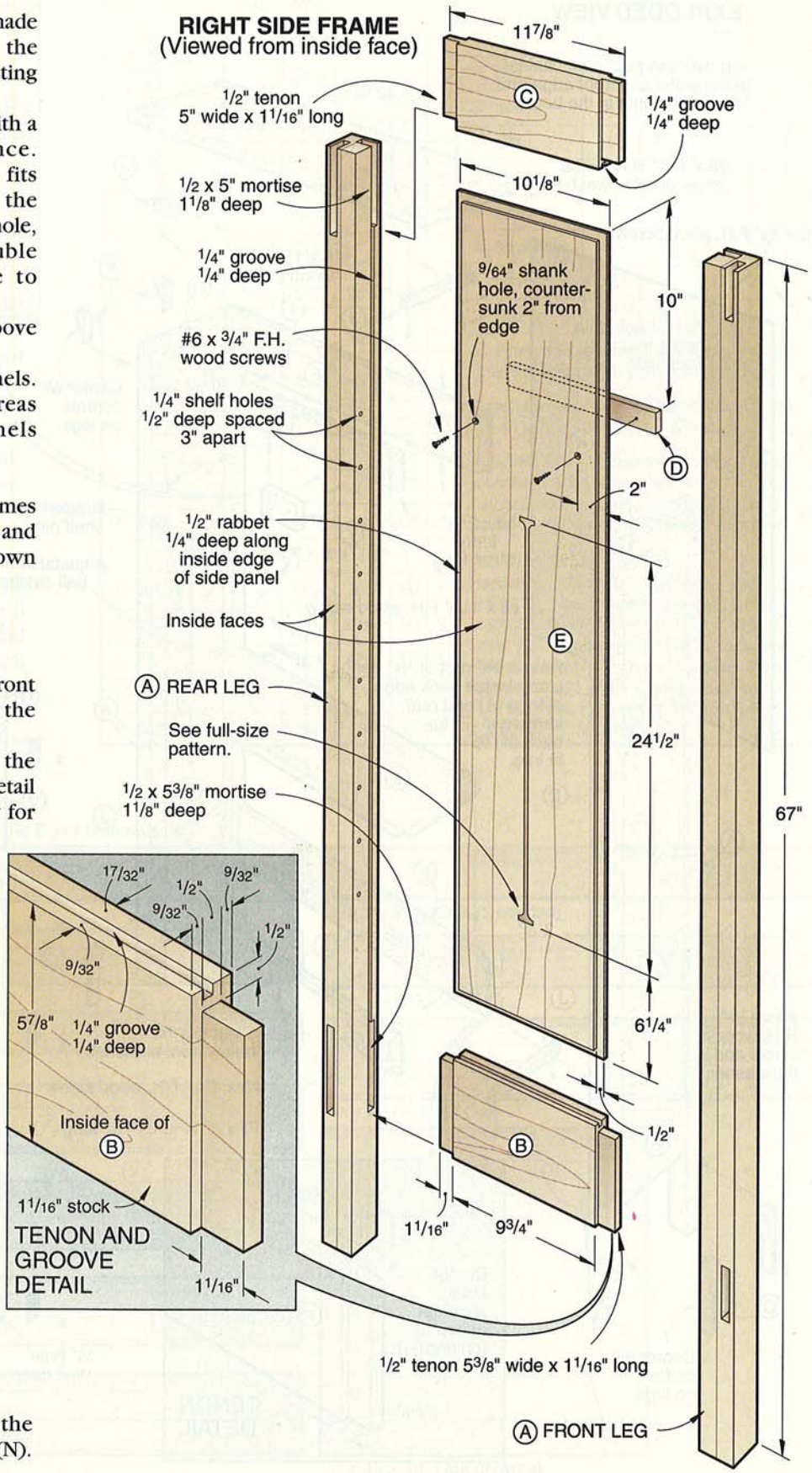
3 Glue and clamp the rails (F, G, H) between the side frames. For proper-fitting doors later, check carefully for square.

4 Cut the cleats (I, J) to size from ¾" square stock. Drill the countersunk mounting holes and form the slots now where shown on the Parts View drawing on the pattern insert. Screw the cleats in place where shown on the Exploded View drawing.

5 Rout the back of the cabinet to receive the ¼" back (K), using a ⅜" rabbeting bit. Square the corners with a chisel. Cut the back panel to size. Drill the countersunk mounting holes, and screw the back in place.

Form the edge-joined bottom, shelves, and top

1 Edge-join 1 1/16"-thick stock for the bottom (L), shelves (M), and top (N).



Position the side-frame panel on your table-mounted router so the ¼" straight bit fits into one of the 5/16" holes in the panel. Start the router, and rout to the opposite hole. The double fence secures the workpiece to ensure a straight groove.

An acid brush works great for brushing glue on the mating pieces when gluing and clamping the side frames together. Use a damp cloth to wipe off excess glue immediately after clamping.

(We made our laminations extra long and wide to start, and then trimmed them to size after the glue dried.) Use the Shelves drawing to cut the bottom and shelves to shape.

2 Attach the top and bottom with screws, as shown on the Exploded View drawing.

3 Using the full-size patterns on the *WOOD PATTERNS®* insert, cut the corbels (O, P) to shape. Glue and clamp the corbels in place, centered on each leg where shown on the Exploded View drawing. Glue the corbels to the legs only, not to the rails (B, G) or top (N).

Cut the parts for the half-lapped doors next

Note: *The front opening of our assembled project measures 34⅛" by 53⅛". The assembled doors have a 1/16" gap top and bottom, between the doors, and between the doors and legs. The no-mortise hinges create the gap between the legs and doors.*

1 Cut the door stiles (Q) and rails (R, S) to the sizes listed in the Bill of Materials.

2 Cut laps on the ends of the stiles and rails where shown on the Door drawing. Note that the laps on the rails (R, S) are 9/16" deep while the mating laps on the stiles (Q) are only ½" deep. (We didn't cut a true half-lap because of the ½" rabbet ½" deep routed on the back side of each door later. The depth of the laps must be the same as the depth of the rabbet for the glass. We test-cut scrap pieces first to verify the depth of cut before cutting the stiles and rails.)

3 Cut a ½" rabbet ½" deep along the inside edge of each stile and rail where shown on the Door drawing.

4 Mark and cut a pair of mortises on the inside edge of each stile (Q) where shown on the Mortise detail accompanying the Door drawing. Machine a pair of mortises in the top edge of each middle rail (T).

5 Cut rabbets across the ends of the middle rails (T) to fit into the bottom mortise of the stiles.

6 Cut the door mullions (U, V) to size. Using the dimensions on the Parts

Continued

Bookcase

View drawing, mark the dadoes on the pieces. Using a tablesaw and a miter gauge fitted with an auxiliary fence and stop for consistent cuts from piece to piece, cut the dadoes in the mullions (U, V).

7 Machine tenons on the ends of the mullions. Glue and clamp the mullions (U, V) together, checking for square. Wipe off any excess glue with a damp cloth. (We clamped the pieces together on a piece of sheet goods to keep the grid flat.)

Assemble the doors and hinge them to the cabinet

1 Dry-assemble the door frames (Q, R, S) with the middle rail (T) and mullions (U, V) in place. Verify the fit, then glue and clamp each door together, checking for square.

2 Cut the glass stops (W, X) to size, and predrill the brad holes through each. (We used one of the brads for a drill bit.)

3 Lay out and mark the centerpoints for the ¼" oak dowels on the front of each door where dimensioned on the Door drawing. Drill the 11/16"-deep holes, plug with ¼" dowel stock, and sand the ends of the dowels flush with the front of each door.

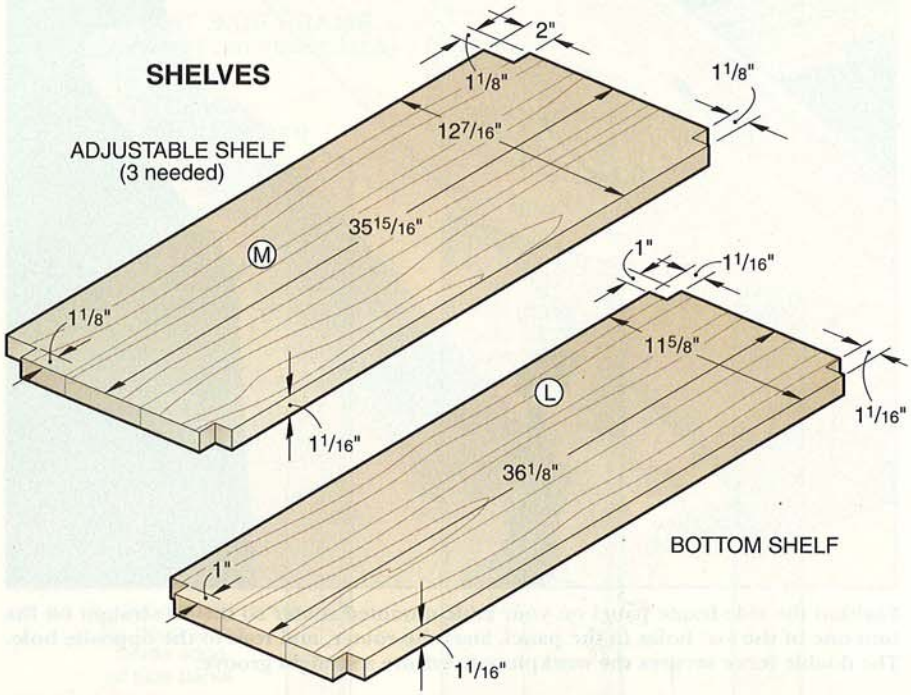
4 Fit the doors to the opening. (Without decreasing the width of the doors, we ripped a 2° bevel on the outside edges of the stiles [Q] to provide clearance between the doors when opening and closing, and to allow each hinge to come together without springback.)

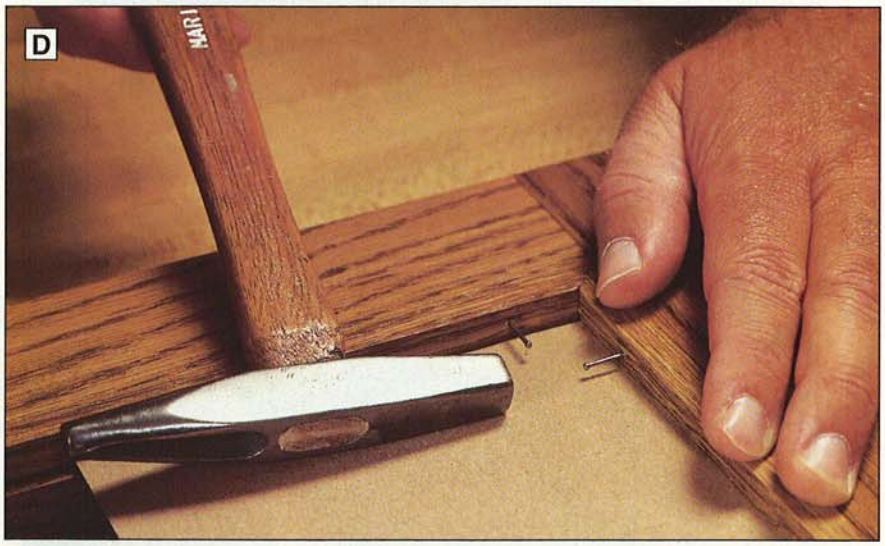
5 Mark the locations, drill the pilot holes, and attach the barrel hinges to the doors where shown on the Exploded View drawing. (We used no-mortise hinges.)

6 Cut the stop (Y) to size. Drill a pair of shank holes in it where shown on the Parts View drawing. Mount the stop to the cabinet; then secure the ball catches to the stop. Secure a second set of ball catches to the bottom shelf. To locate the catch strikes precisely, insert a strike in the ball catch and loosen the catch until the strike can be easily pulled out. Repeat for the other catches. With the strikes in the catches, adhere a small piece of double-face tape to the back of each strike, and close the doors. Now open the doors, taking care not to pull the strikes loose from the doors, and mark the mating locations on the back side of the doors. Attach the strikes using the Stop detail accompanying the Exploded View drawing for reference.

7 Mark the centerpoints on the doors, and drill the holes for the pulls. See the Door drawing for reference.

8 Remove all the hardware from the cabinet and doors.



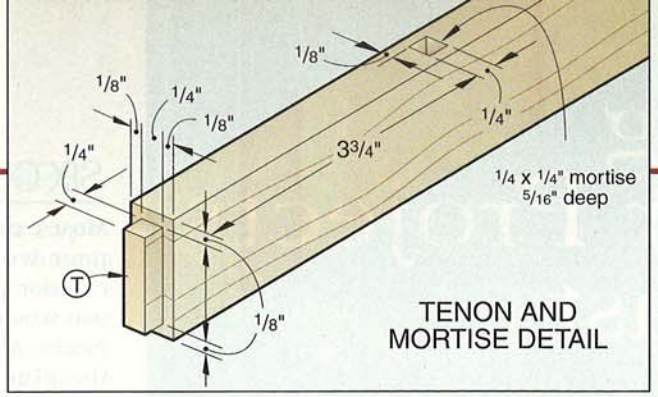


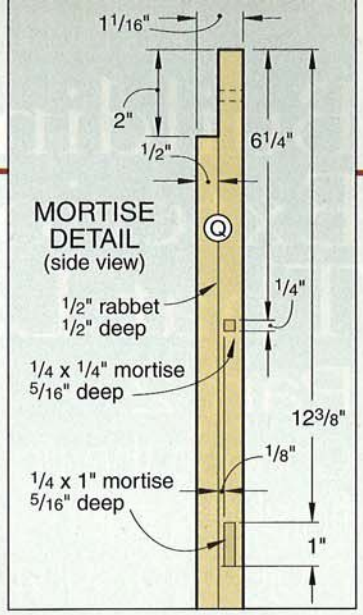
A piece of tablet-back cardboard protects the glass when nailing the oak glass stops to the door frame.

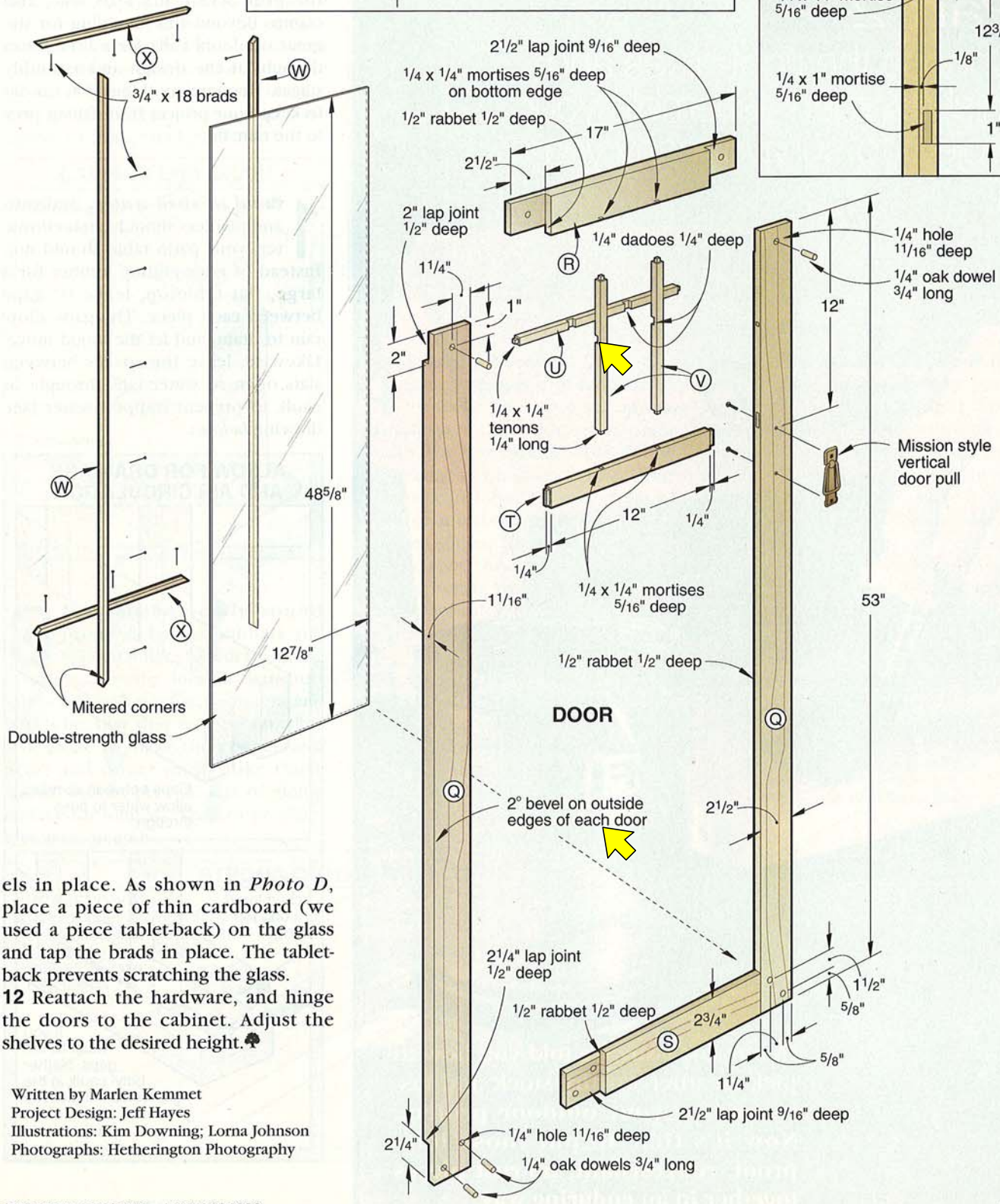
9 Cut the glass for the doors. (We recommend taking the doors to a glass shop and having the glass cut to fit.)

10 Finish-sand all the parts. Stain as desired (we used Minwax Provincial #211 a good choice for imitating that time period), or see our arts-and-crafts fumeless finish article in the November 1998 issue of *WOOD*. Apply the finish. (We brushed on several coats of satin polyurethane.)

11 Position the door frames with the good face down, and set the glass pan-







els in place. As shown in *Photo D*, place a piece of thin cardboard (we used a piece tablet-back) on the glass and tap the brads in place. The tablet-back prevents scratching the glass.

12 Reattach the hardware, and hinge the doors to the cabinet. Adjust the shelves to the desired height.

Written by Marlen Kemmet
Project Design: Jeff Hayes
Illustrations: Kim Downing; Lorna Johnson
Photographs: Hetherington Photography

Building Exterior Projects That Last

Part 2

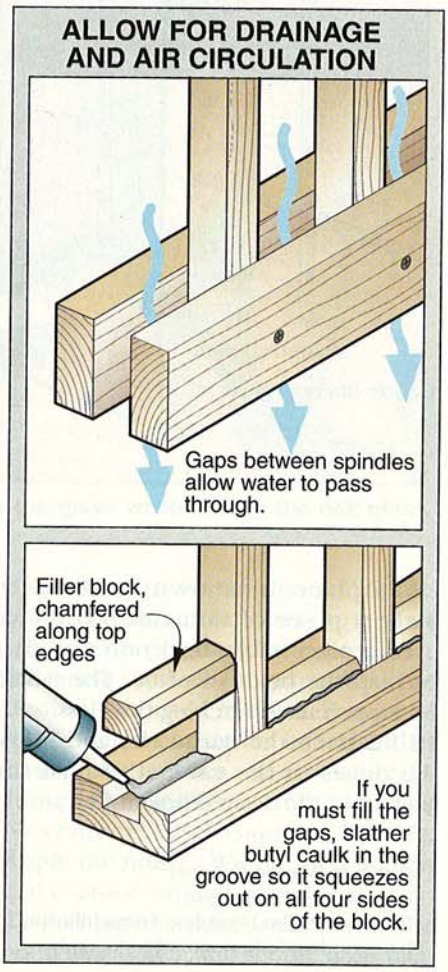
Choose the right glues and finishes, then assemble your project to survive many years.

In our last issue we told you how to pick weather-worthy stock and fasteners for your outdoor project. Now it's time to put those bug-proof, rot-resistant, no-rust pieces together in an enduring way.

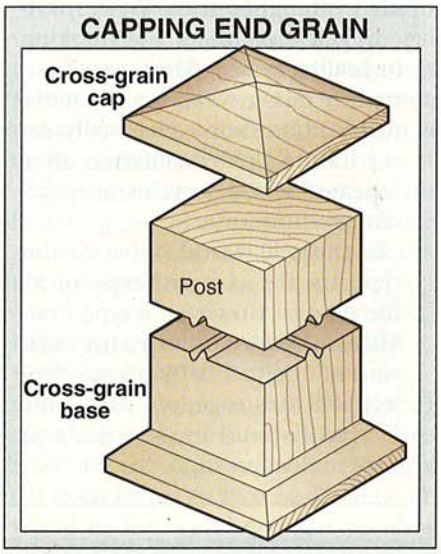
SIX CONSTRUCTION TIPS

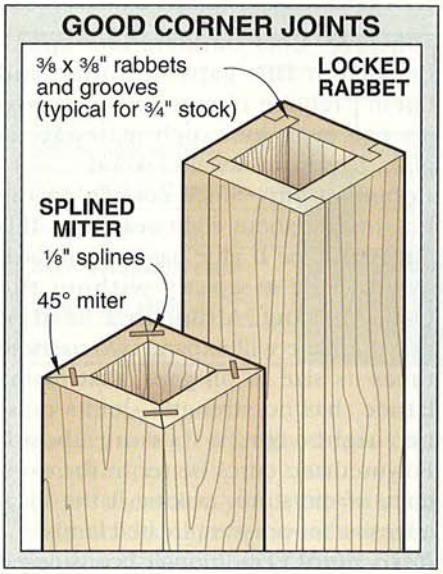
Most exterior glues can't overcome poor workmanship, so build your exterior projects with the same care you would use on your finest interior pieces: Make tight-fitting joints; work the glue while it's still wet; and clamp. Beyond that, building for the great outdoors calls for a little extra thought at the design and assembly stages. Here are six things you can do to keep your project from falling prey to the rain:

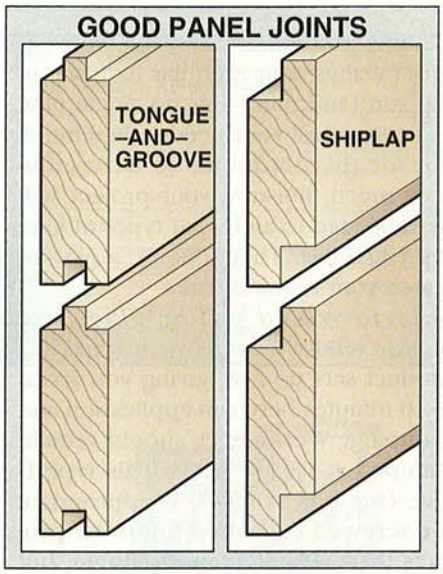
1 ***Build to shed water.*** Birdbaths and planters should catch rainwater; your patio table should not. Instead of edge-joining lumber for a large, flat tabletop, leave ⅛" gaps between each piece. The gaps allow rain to drain, and let the wood move. Likewise, leave the spaces between slats open so water falls through, or caulk to prevent trapped water (see drawing *below*).


ALLOW FOR DRAINAGE AND AIR CIRCULATION
Gaps between spindles allow water to pass through.
Filler block, chamfered along top edges
If you must fill the gaps, slather butyl caulk in the groove so it squeezes out on all four sides of the block.

2 ***Minimize end-grain exposure.*** Moisture moves through end grain like soda through a straw, so plug up end grain by sealing it with finish or caulk, or capturing it in a joint. For end grain that points to the stormy sky or touches the ground, consider covering it with a cross-grain cap, as shown *below*. Also, keep the edges of laminations from facing up, and fill the edges of plywood with epoxy, or primer and paint.





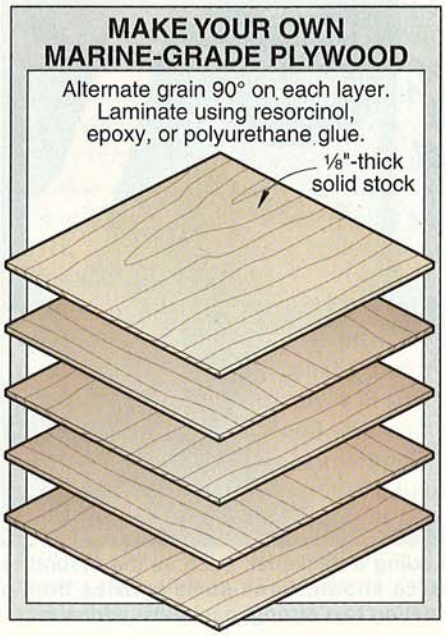


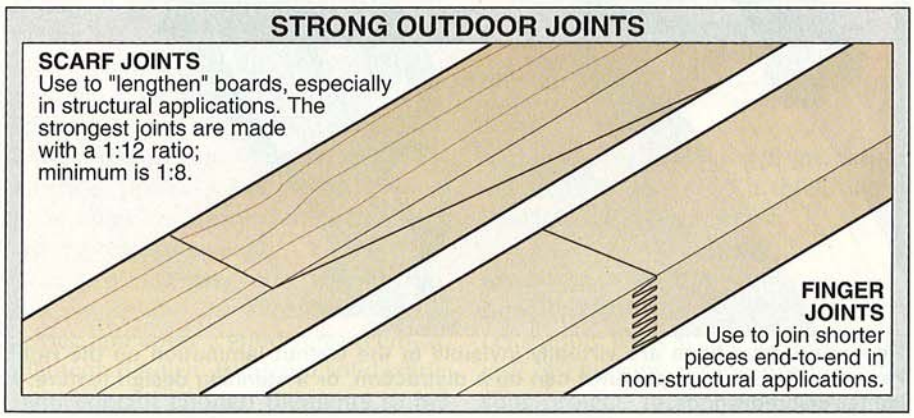
3 ***Use mechanically sound joinery.*** Locked rabbets and splined miters (see drawing *top center*) are more durable than butt joints and non-reinforced miters and bevels because they rely less on adhesive alone to make the connection. Scarf and finger joints, like those shown *below*, provide lots of gluing surface for long workpieces or when gluing up an arch.

4 ***Fasten with care.*** The key to using fasteners in your outdoor project is to avoid any stress that damages the wood or leaves a dimple that holds water. That means pre-drilling screw holes and driving fasteners just below the surface. Avoid counterboring for bolt heads and nuts unless there's a danger of injury from the jutting fastener. (Counterboring opens up more end grain to moisture.)

5 ***Allow for shrinking and swelling.*** Weather-exposed wood changes size more often than a lottery jackpot. Use tongue-and-groove or shiplap joints (shown *top right*) for broad vertical surfaces to keep the inevitable wet/dry cycles from tearing apart your project.

6 ***Make your own plywood.*** For fragile fretwork or parts, such as wheels, that must endure stress from multiple directions, you can fabricate your own marine-grade plywood as shown *below*. Resaw and plane an odd number of thin pieces of your project stock (the more the better), then laminate them back together using polyurethane, epoxy, or resorcinol adhesive, and rotating the grain 90° each layer. The parts will be stronger and more stable than solid stock, and will match the wood in your project.


MAKE YOUR OWN MARINE-GRADE PLYWOOD
Alternate grain 90° on each layer. Laminate using resorcinol, epoxy, or polyurethane glue.
⅛"-thick solid stock


STRONG OUTDOOR JOINTS
SCARF JOINTS
Use to "lengthen" boards, especially in structural applications. The strongest joints are made with a 1:12 ratio; minimum is 1:8.
FINGER JOINTS
Use to join shorter pieces end-to-end in non-structural applications.

Continued

USE ADHESIVES THAT TAKE A LICKIN' AND KEEP ON STICKIN'

A number of adhesives make weatherproof claims, and each has its place in the sun (and rain). But no single glue can address all your needs when building for the outdoors, so determine how much moisture your project will be subjected to and what types of joinery you'll use. Then, choose a glue to match your requirements.

Exterior-rated yellow glue. Like regular yellow woodworking glue, this product sets up fast, giving you about 5-10 minutes between application and clamping. Workpieces should remain clamped at least 1 hour. This type II glue (see box at *right*) is appropriate for screwed or bolted joints on projects that will sometimes see rain, but rarely venture underwater.

Epoxy. Because so many varieties exist, epoxies are tough to pin down. Some are type-I waterproof, while others (mostly the fast-curing 5- and 10-minute formulations) are not. Some are thick enough to use as mixed, others must have a thickener, such as fumed silica (shown *below left*), added before they can be used as an adhesive. Boat builders like epoxy because it fills gaps in joints, and doesn't require clamping. Most epoxies can even join such materials as glass, plastic, or metal to wood.

Polyurethane. Since coming on the U.S. market about eight years ago, this one-part, type II glue has proven itself as versatile as epoxy without the messy mixing. Although a bead of polyurethane will expand two to three times its size to fill gaps, that foamy lattice has no strength—joints must be tight for a strong bond. Polyurethane cures better in the presence of moisture, making it the ideal adhesive for pressure-treated lumber.

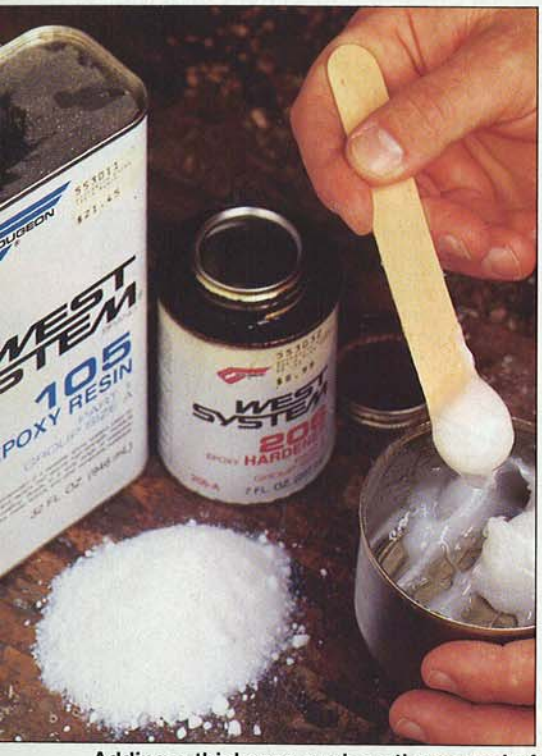
Resorcinol. Traditionally considered one of the best type-I adhesives for laminating, resorcinol withstands submersion in salt water better than other glues, so it's a great candidate for projects constantly exposed to salty sea air. However, as you can see in the photo *below*, resorcinol leaves a visible dark red or purple glue line that can be unattractive on projects made from light-colored wood.

By the numbers: Type I vs. Type II glue

You've probably read of water-resistant glues being rated as "type I" or "type II," but wondered what that means. Is one more waterproof than the other?

Well, the government tags type I honors on an adhesive that survives strength-testing after repeated cycles of drying and dunking in boiling water. Glues earning a type II rating were not strength-tested, but showed virtually no separation or delamination after repeated wet/dry cycles in room-temperature water.

In the real world, most of the type IIs are as weatherproof as the type Is. However, a type I rating can give you an extra measure of confidence that your project will stay together, especially if it will spend long periods of time underwater.



Adding a thickener, such as the mound of silica shown, turns some epoxies from a coating to a strong, paste-like adhesive.

Resorcinol glue lines are virtually invisible in the walnut lamination on the right. However, the dark purple lines can be a distraction, or a stunning design feature, in lighter-colored woods.

APPLY A FINISH THAT WON'T DIMINISH

If you're looking for the perfect outdoor finish, you'll probably find it right next to Bigfoot because they're equally elusive. Any coating you choose will be a compromise of one kind or another, so choose the best exterior finish for your needs with the help of the chart *on page 75* and the tips that follow.

Whatever coating you decide on, remember these tips:

•Many products designed for exterior use contain a mildewcide, which can produce a severe allergic reaction. Don't use a paint or stain containing mildewcide on surfaces that may be in direct contact with food.

•Let pressure-treated lumber dry out before applying a finish. In warm, dry summer weather, it will take only two to three weeks.

Like you, your project needs sunscreen and a raincoat

Despite the hype and the myriad of coatings marketed for exterior use, selecting the right one for your project boils down to two basic facts: (1) wood in the weather has two chief enemies—the sun and the rain and (2) short of keeping your outdoor project *indoors*, no finish on Earth can completely protect it from either.

The ultra-violet (UV) rays of the sun begin to destroy a wood surface almost immediately, giving it the silver-grey color you're familiar with. The degradation accelerates as the wood begins to crack and check, allowing moisture to penetrate deeper into the wood.

So what's a woodworker to do? Ideally, keep your exterior project out of the elements by placing it out of direct sunlight, say in a porch or covered deck, or by storing it in a shady spot when not using it. That's fine for lawn furniture and other small, easily movable projects, but you can't just pack away the front door or garden arbor every sunny day.

For projects that must endure the sun day in and day out, take Mom's advice and apply a good sunscreen—a pigmented finish. Paint and solid-color stain contain enough pigments to be opaque, so both offer good protection from the sun.

Mom also made you wear your raincoat outside when the weather turned nasty, and your project deserves the same shelter. Any coating that encases the wood in a protective film will keep water from going in like a raincoat. But sooner or later, moisture will find its way beneath the film and cause it to fail. So, you want to cover your project with a soft coating that repels water.

Another real option is one seldom considered by most woodworkers: to put your project out into the elements with no coating at all. The most rot-resistant species of wood, as long as they're not in constant contact with the ground or water, will weather away only about ½" in a century. However, without a mildewcide

Spar varnishes

applied, your project will grow dark splotches at best, and a thick (albeit UV-blocking) fuzz at worst.

Opaque coatings block sun best

Let's apply what we've learned to the task of choosing the proper finish for your project. In a perfect world, the ultimate outdoor coating would contain a mildewcide and loads of pigments, prevent moisture penetration without forming a hard shell, and be easy to maintain.

Semi-transparent stains

Paint and solid-color stain (essentially thinned-down paint) come pretty close to that ideal because both are thick with pigments so the wood beneath never sees the light of day. That's a good part of the reason why wood siding on properly painted and maintained homes can last more than a hundred years. This kind of longevity is even more likely today because a good acrylic latex paint remains flexible enough after curing to stretch with the wood as it expands and shrink back as it contracts.

That's not to say that paint and solid-color stain are perfect. Even if you coat each piece individually before assembly, water eventually will work its way through the wood and come up beneath the paint, causing the coating to blister and peel off. Puddles on horizontal surfaces accelerate this kind of bubbling finish failure—one reason why these coatings are a poor choice for decks.

Continued

RACE TO THE FINISH

Coating	Years Between Re-application
Marine/Spar varnish	6-months – 1 year
Water-repellent preservative	1–2 years
Penetrating oil	1–2 years
Semi-transparent stain	3–7 years
Solid-color stain	3–7 years
Paint	7–10 years

Solid-color stains

Here are some ways to get the most out of paint and solid-color stain:

•Prime first. Conventional wisdom says that an oil-based primer is the best preparation for latex paint, but it's not so anymore. Environmental concerns and improved technology have put water-based primer on a par with its oil-based brother under both paint and solid-color stain. The only exception: Oil-based primer bonds better with weathered wood.

•Acrylic latex paint performs as well as oil-based but is easier to clean up, so make it your first choice for projects that won't be handled, such as a birdhouse or arbor. However, it tends to be sticky when warmed by the sun, so on furniture and toys, brush on an oil-based enamel. Start with a high-quality primer and follow with two coats of paint.

•Seal exposed areas of end grain, especially at joints and places where a piece will make ground contact, such as the leg bottoms of a table or chair. These spots are highly prone to coating failure as shown *below, bottom left*. To retard this, dip end grain in a paintable water-repellent preservative (WRP) for about 10 seconds, let it dry, then prime and topcoat.

•Repair cracked paint by first daubing paintable WRP in the fissures. Wipe away any WRP from previously painted surfaces before applying primer and paint to the damaged area.

•Two commonly used outdoor woods, redwood and cedar, excrete water-soluble components that can bleed through a latex paint. To avoid the problem, prime with a stain-blocking latex primer, such as Kilz Total One (800/325-3552), before painting.

Want to see the wood grain? The solution is not so clear

Finishes that allow you to enjoy the beauty of the wood grain in your deck or porch swing fall into one of two categories. They either form a hard film over the wood, or they absorb into the wood's surface.

Because clear film-forming finishes, such as varnish, polyurethane, and epoxy, contain no sun-blocking pigments, they allow damaging UV rays to pass through to the wood unchecked, degrading the wood's surface. The wood soon sloughs off that damaged top layer of cells, taking the finish with it, leaving you with a cracked, flaking project, as shown *below, top left*. To repair this kind of damage you need to sand down to bare wood and start all over again.

Clear film-forming finishes adhere only to the top layer of wood cells. When the sun destroys those cells, the wood sheds them, along with the finish.

The dark overlap lines shown above occurred when fresh stain was applied over dried stain, doubling the pigment.

Treating the end grain of these two pieces of wood siding with a water-repellent preservative before painting would have reduced the moisture penetration that caused the paint to fail.

Clear film-formers work best where they're sheltered from direct sunlight and rain. For instance, a North-facing wooden entry door will hold up well with a few coats of spar varnish—especially if further protected by a storm door—because it will never feel the effects of the sun or rain.

On the other hand, penetrating oils, oil-based semi-transparent stains, and WRPs absorb into the wood instead of forming a hard shell on it, so they don't crack as the wood shrinks and swells. Compared to film-forming finishes, renewing a penetrating finish is a stroll on the boardwalk. Simply clean the surface with a detergent and an oxidizer (many commercial deck-cleaning solutions contain both), then brush the new finish over the old. But unpigmented or lightly pigmented penetrating finishes provide virtually no defense against UV rays, meaning your project will still suffer in the sun.

Some penetrating oils, such as Penofin 550 (Performance Coatings, 800/736-6346), Ready Seal (Ready Products, 972/434-2028), and Total Wood Preservative (Gemini Coatings, 800/262-5710), appear clear to the eye, but in fact contain loads of ultraviolet inhibiting pigments, ground to near-microscopic levels. These tiny pigments, in sufficient quantities, effectively block the bulk of the UV rays from reaching the wood. How can you tell if a penetrating oil uses finer pigments? Look for trans-oxide pigments in the labeled ingredients.

Oil-based, semi-transparent stain combines a low price with the better features of both paint and penetrating oil. It contains enough coarse pigment to partially shield your project from UV rays, and because the finish doesn't form a hard film, you're free

from the drudgery of sanding away the peeled coating at renewal time.

Whether you choose a penetrating or a film-forming finish, get clearly better results by following these tips:

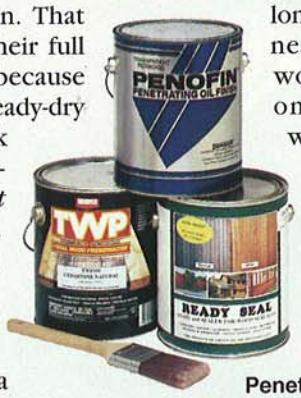
•The labels of some inexpensive clear finishes brag about having "UV protection added," but these products provide only a marginal barrier to the sun. The protectants aren't pigments, but mostly synthetic UV blockers, which are more fragile than pigments and work only for a few months after being applied.

•Maintain a "wet edge" when brushing on a penetrating stain. That means finishing boards their full length before stopping, because fresh finish applied to already-dry finish leaves a doubly dark area where the two overlap (see *lower right* photo, *opposite page*). This no-lapping rule also makes it more difficult to repair and blend high-traffic areas later.

•For a glossy look, apply a semi-transparent stain first; then top it off with a varnish. The stain protects the wood from UV damage and at least triples the life of the varnish. The Sikkens Cetol finishing system (800/833-7288) operates on this principle.

•You say you can't bear to add *any* color to the wood? We don't recommend it, but if you insist on a clear finish, use an untinted water-repellent preservative. Commit yourself to reapplying every six months or so, and remember that the sun will continue to degrade the wood.

•On rough-sawn or weathered wood, oil-based semi-transparent stains last longest because the pigments nestle in among the coarse wood fibers, rather than lie on the smooth surface, where they can be knocked off easily. By the same token, a light sanding of smooth wood activates the surface to accept any finish, water- or oil-based, more readily.



Penetrating oils with finely ground pigments

Water-repellent preservatives

Finish fast, or is it better with age?

You may have heard that you should leave your project unfinished for several months before applying a finish, but don't. Film-forming finishes don't bond well with weathered wood, so you'll need to thoroughly clean and possibly even sand before you prime and paint. On the other hand, a penetrating finish actually appreciates a little vintage.

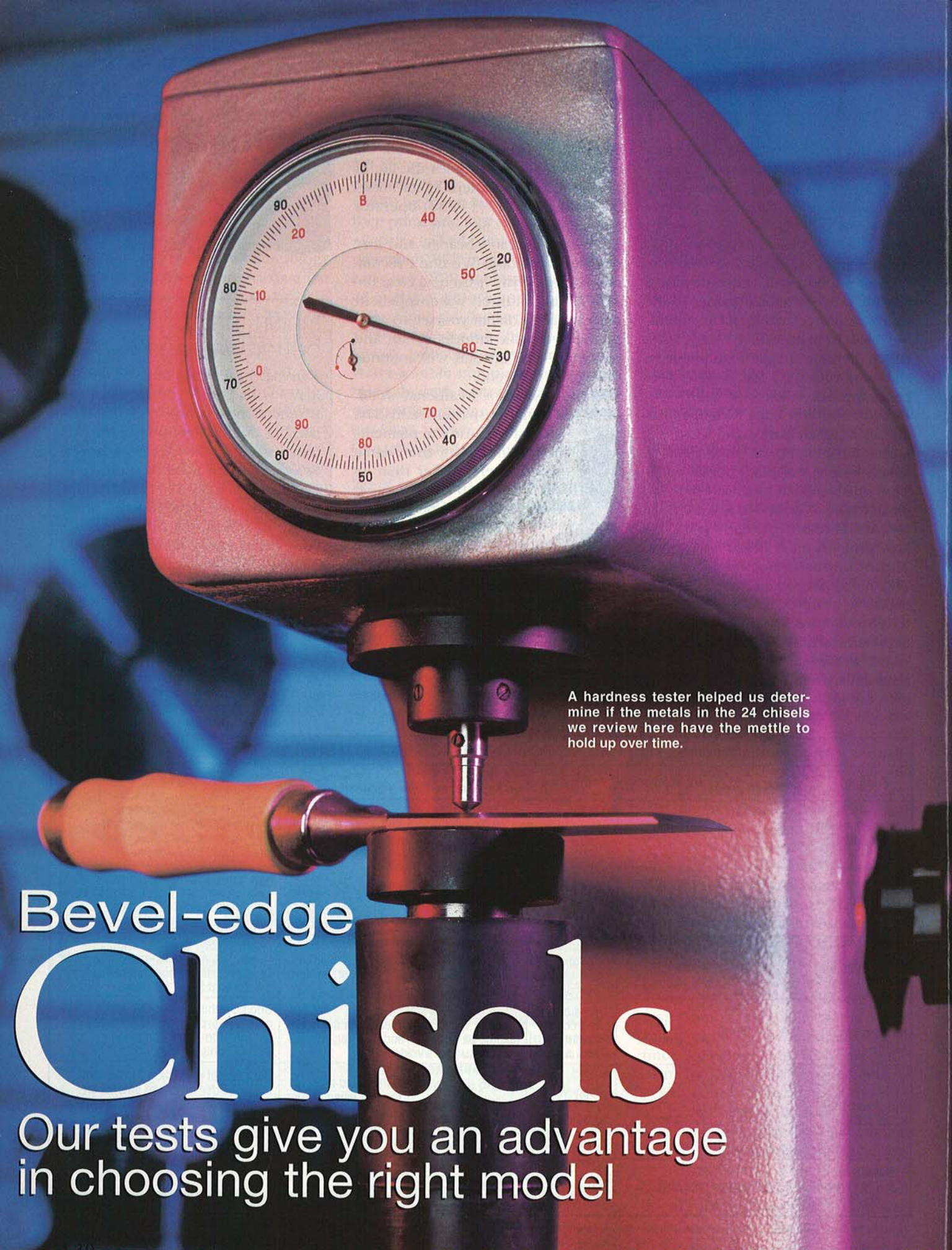
The Forest Products Lab suggests applying a WRP to your project right away to slow the weathering while still allowing some cracking and checking. Then, a year later, choose and apply a pigmented penetrating finish to your project.

OUTDOOR COATINGS IN A NUTSHELL

Coating	Type (1)	Cost (2)	UV Blocker (3)	Application	Finished Appearance	Periodic Maintenance	Comments
Water-repellent preservative	P	$6-7	None	Brush or dip.	Grain visible; wood color fades with age.	Clean with detergent and oxidizer; reapply.	Readily available. Not an effective finish by itself, but an excellent pre-treatment when used under paint or solid-color stain.
Marine/spar varnish	F	$20-30	None*	Brush 3–10 coats.	Grain and natural wood color visible; yellows with age.	Clean and sand when finish begins to peel or dull; apply two new coats.	Soft film-finish flexes well with wood movement. Not recommended for projects exposed to direct sunlight or rain.
Penetrating oil	P	$25-37	None, to finely ground pigments	Brush, roll, or spray 1–2 coats, or dip.	Grain visible; slightly colored as desired.	Clean with detergent and oxidizer; reapply.	Easy to apply. Requires frequent reapplication to remain effective. Oils with finely ground pigments are the best finish for decks.
Semi-transparent stain	P	$9-16	Light pigment	Brush or roll 1–2 coats; maintain wet line.	Grain visible; colored as desired.	Clean with detergent and oxidizer; reapply.	Good combination of UV- and moisture-protection. Traffic areas are tough to repair and blend with old finish.
Paint and solid color stain	F	$12-25	Heavy pigment	Apply WRP, then brush on primer and 2 top coats.	Grain and natural color hidden.	Clean and reapply topcoat when primer begins to show; sand if finish is flaking.	Best overall protection for outdoor projects. Use oil-based enamel on furniture; otherwise choose an acrylic latex. Stain performance is much improved with primer. Do not use on horizontal surfaces.

Notes:
1. (P) Penetrating (F) Film-forming
2. Approximate cost per gallon
3. (*) Marine varnish contains UV absorbers, which offer only short-term protection from UV rays.

Written by Dave Campbell Photographs: Baldwin Photography, Forest Products Society Illustrations: Kim Downing



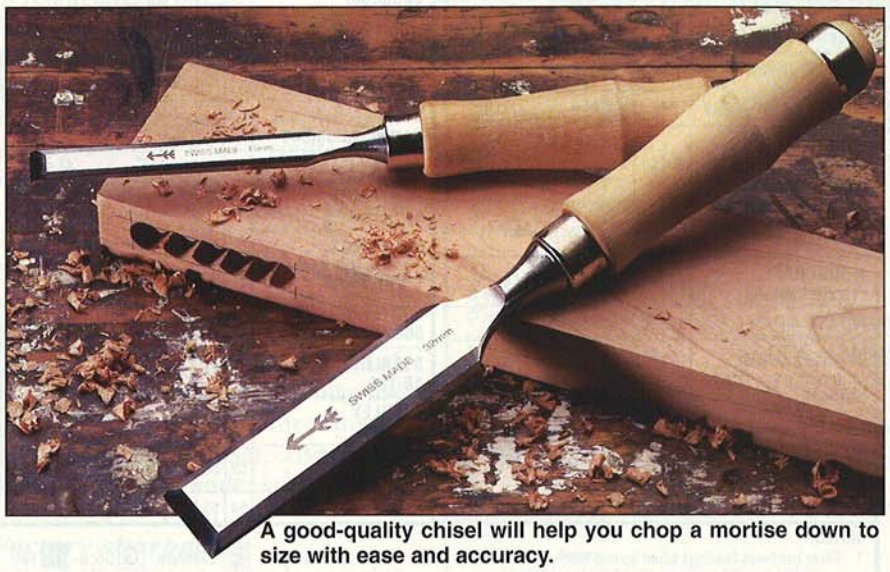
A hardness tester helped us determine if the metals in the 24 chisels we review here have the mettle to hold up over time.

Bevel-edge Chisels

Our tests give you an advantage in choosing the right model

A good-quality, properly sharpened chisel is a joy to use. It feels like a natural extension of your hand as it slices through wood with ease, faithfully delivering just the cuts you need. Its hard edge stays razor-sharp cut after cut.

If you know this sensation—good for you. If not, or if it's been awhile, stay tuned as we tell you which of today's bevel-edge chisels are capable of transporting you to this woodworking paradise.



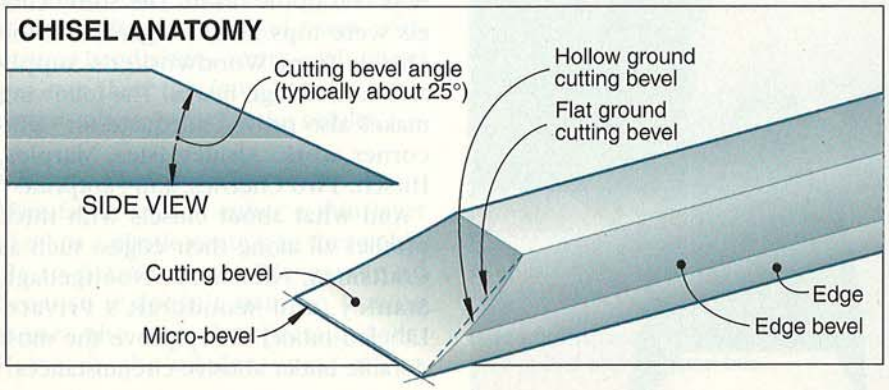
A good-quality chisel will help you chop a mortise down to size with ease and accuracy.

First, a few words about the chisels in our test

In this article we focus on general-purpose bevel-edge chisels like the ones *above.* As their name implies, these chisels have beveled edges that help you maneuver the cutting edge into tight spots. They may not be perfect for every task, but they're just the thing for general use. If you can own just one set of chisels, look no further.

We investigated 24 different models of bevel-edge chisels in sets with four to nine pieces each. The typical set has five pieces with ¼"-, ⅜"-, ½"-, ¾"-, and 1"-wide blades. Some of the larger sets include ⅝"-wide models, and blades up to 2" wide. Most of the chisels are European imports in metric widths that are close to their stated size in inches.

Prices vary considerably. Some of the less-expensive five-piece sets on today's market can be had for about $30, but the best chisels will set you back over three times that much for the same number of pieces.



Fast Facts

- The best chisels in our test cost close to $100 for a four-piece set. But, you can buy many high-quality four-piece sets for under $70.
- Most of the tested chisels work well for furniture making, but some are best for construction tasks—although you won't find them branded that way. You may want a set of each.
- Even the least-expensive chisel with a well-honed edge will outperform the best chisel with a dull edge.
- Choosing a chisel with a wooden or plastic handle is largely a matter of aesthetics. We found little difference in performance between the two.

How we pounded and prodded the chisels

We put each of the chisels through a battery of trials to determine how well they will perform for you. Before slicing into wood, though, we inspected each of the chisels for factory-edge sharpness. (It was all over the place—more on that later.) We recorded key blade geometries, such as the angle of the cutting bevel (see illustration *below left*) and the profile of the edge grind. With the hardness tester shown on the *opposite page,* we checked the Rockwell hardness of each blade at various locations along its length.

Next, we brought each of the cutting edges up to an equal sharpness and added a micro-bevel (see illustration *below left*). We checked their cutting performance with across-the-grain and with-the-grain cuts in red oak and pine. (With properly sharpened edges they all cut well.) To gauge the durability of the handles, we drove each chisel into a heavy block of wood with 100 heavy mallet blows.

And because of the subjective nature of determining handle comfort, we put the chisels in the hands of four staffers, with hands ranging from small to large. Not surprisingly, each of them preferred a different handle.

Continued

Chisels

Key points to consider when choosing a chisel

• *How it will be used*

Most of us need a good chisel for typical woodworking tasks, such as cleaning up joints and hardware mortises. For this type of delicate work that doesn't require a mallet, choose a chisel with a low bevel angle on the cutting edge and a comfortable handle. (The chart at the end of this article has bevel angles for all of the chisels.) The lower bevel angle helps the edge slice through hard woods with less resistance.

If you envision doing these tasks and heavier-duty furniture-making work, such as chopping deep mortises, select a chisel with a hard blade and a durable handle that stands up to mallet blows. If you prefer wooden handles over plastic, select one with ferrules (the metal bands at both ends of the handle). These help prevent the handle from splitting when struck.

On the other hand, if you intend to use the chisels for more-abusive carpentry tasks, such as removing large amounts of material in softwood 2×, 4×, and 6× stock, opt for a chisel with a plastic handle with a strike plate on its end. Why? Chances are you'll reach for the nearest striking tool, generally a steel hammer, when doing carpentry. Such handles—found on less-expensive chisels from Craftsman, Nicholson, and Stanley—hold up well to blows from steel hammers.

These chisels also have relatively high cutting bevels—another advantage for abusive work. The high angle puts more steel mass behind the cutting edge, so it holds up better if you strike a nail or other hard object. These less-expensive chisels have blades made of softer steel, so they dull faster, but that's not all bad in this case. You can quickly grind the softer steel back to a sharp edge if you seriously damage the edge.

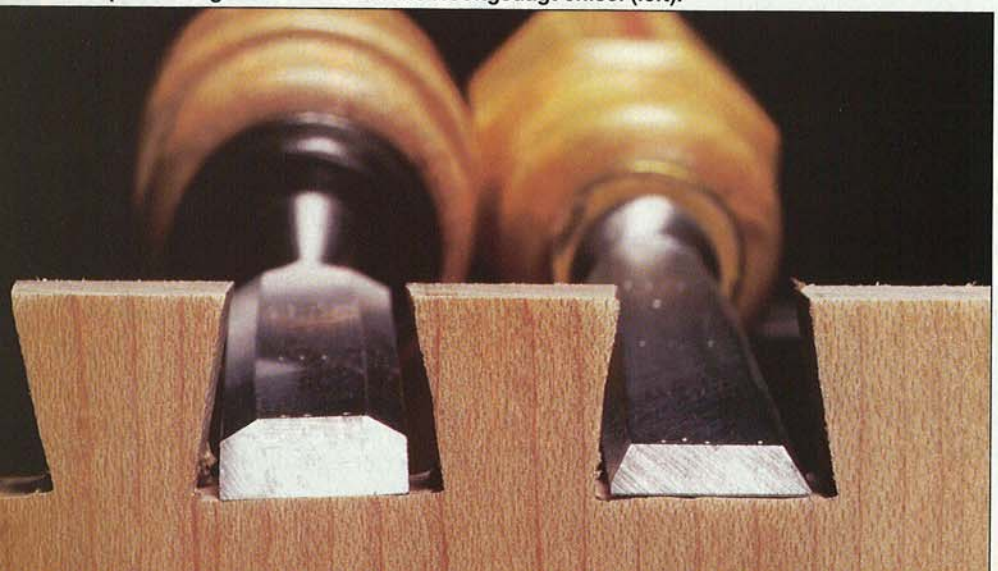
HOW THE TESTED CHISELS FARED IN A HARDNESS TEST
(ROCKWELL HARDNESS C SCALE)

CHISEL	TIP	CENTER	SHANK	CONSISTENCY OF TIP (1)	HARDNESS CONSISTENCY ACROSS SET (2)
SWISS MADE	62	62	49	E	E
SORBY Rosewood Handled	61	60	37	E	*
WOODWORKER'S SUPPLY German Bevel-Edged	61	60	25	G	G
WOODWORKER'S SUPPLY Rosewood Handled	60	58	54	E	G
MARPLES Blue Chip	60	60	17	E	G
WOODCRAFT Private Labeled	60	61	42	G	G
FREUD	59	60	59	G	G
GARRETT WADE	59	61	56	G	G
HIRSCH	59	59	31	G	G
TWO CHERRIES Plastic Handled	59	60	53	E	E
TWO CHERRIES Wood Handled	59	60	34	E	E
MARPLES Splitproof	59	60	17	E	G
NOOITGEDAGT	59	59	42	G	G
SANDVIK Wood Handled	59	60	38	F	F
SORBY Boxwood Handled	59	59	26	E	E
ASHLEY ISLES	59	59	25	E	E
FOOTPRINT 85 Series	58	60	26	G	G
BUCK BROS.	57	60	35	E	G
CRAFTSMAN	57	58	59	G	G
FOOTPRINT 565 Series	57	58	24	F	F
STANLEY 16-180	57	23	23	F	F
STANLEY 16-902	57	33	23	E	F
WOODCRAFT Butt Chisel	57	55	39	F	F
NICHOLSON	54	55	55	G	G

NOTES:
1. Three hardness readings taken across width of tip. 2. (*) Only one chisel tested.

E Excellent G Good F Fair

The beveled edge on Sorby's Boxwood Handled chisel (right) helps it get into tight spots with greater ease than the Nooitgedagt chisel (left).

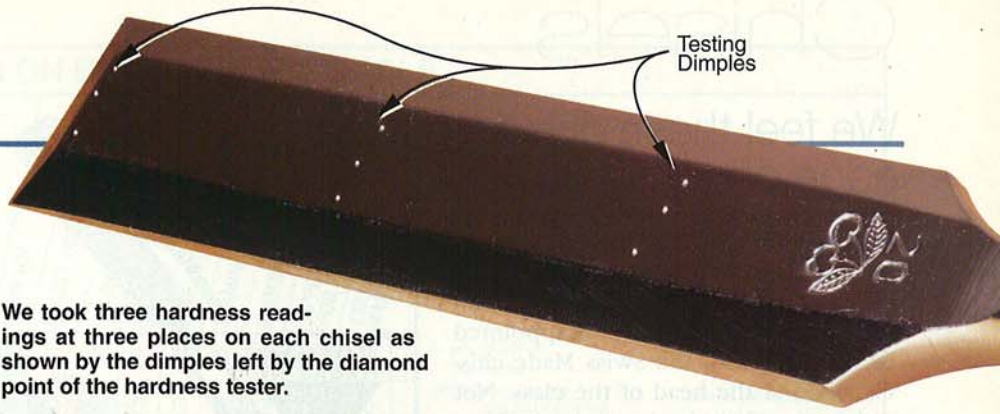


• *The profile of the edge grind*

Although all of the chisels in this test have beveled edges, the amount of bevel, and the thickness of the blades, varies by brand. As the chart at the *end of this article* shows, some edges are thin for the length of the blade, most taper from thin at the blade to thick near the handle, and some are thick for their full length.

How does this affect you? If you need to clean out tight corners like those on the dovetails at *left*, choose a model with a thin edge near the business end of the blade. The Sorby chisels were tops in this regard, and the chisels from Woodworker's Supply also earned high marks. The following makes also proved adequate for tight-corner work: Alshley Isles, Marples, Hirsch, Two Cherries, and Footprint.

And what about chisels with thick profiles all along their edges, such as Craftsman, Nicholson, Nooitgedagt, Stanley, and Woodcraft's Private-Labeled model? They prove the most durable under abusive circumstances.



We took three hardness readings at three places on each chisel as shown by the dimples left by the diamond point of the hardness tester.

• *Blade hardness*

As the chart at *left* shows, the chisels varied considerably in the hardness of their steel. Of the three readings we took along the length of the blade—near the tip, center, and shank—pay careful attention to the tip rating. Simply put, the higher the hardness rating, the longer the cutting edge will retain its sharpness.

Also, look for a chisel that is consistently hard across the width of its tip (we took three readings at each of three locations as shown by the dimples in the photo *above right)*. And, note that some models showed better hardness consistency from chisel to chisel within a set.

Although the hardness of the shank end isn't incredibly important if you use the chisel properly, take this rating into consideration if you think someone (not you of course!) may use the chisel for prying something (a paint can lid, perhaps?). The softer shanks could bend under such abuse.

• *Factory sharpness*

Most of the tested chisels require some honing on your part before they will cleanly slice wood fibers with just hand pressure. Of the tested chisels, only three models—Ashley Isles, Sorby Rosewood Handled, and Swiss Made—were well honed upon delivery and earned an "excellent" rating under "factory sharpness" in the chart at the *end of this article*. Of these three, the Swiss Made were exceptionally sharp; they had been honed *and* stropped at the factory to razor-like sharpness.

• *Handle comfort*

To judge this area we asked four staffers—frequent chisel users with various hand sizes—to try each chisel and rate their top four. See the information *above right* for the results.

• *Blade finish*

Manufacturers add either a thin layer of oil or a plastic coating to these chisels to prevent rust. We prefer oil because it doesn't gum up honing stones the way that plastic does. However, the oil does wear off, so you need to reapply it every now and then; the plastic stays on permanently unless you remove it with abrasives.

HOW OUR JUDGES RATE HANDLE COMFORT

Jim Downing, Senior Design Editor

SMALL HANDS

1. Hirsch
2. Two Cherries Plastic Handled
3. Marples Blue Chip
4. Nooitgedagt

Chuck Hedlund, Project Builder

MEDIUM HANDS

1. Woodcraft Butt Chisel
2. Marples Blue Chip
3. Two Cherries Plastic Handled
4. Swiss Made

Jan Svec, Assistant Design Editor/ Project Builder

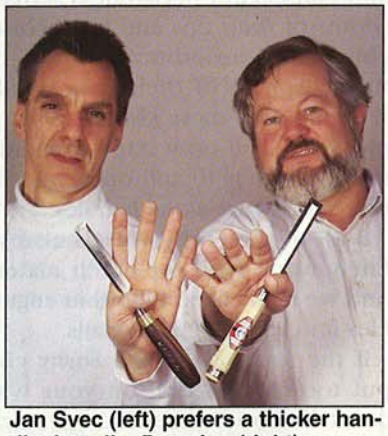
MEDIUM HANDS

1. Sorby Rosewood Handled
2. Footprint 85 Series
3. Marples Blue Chip
4. Swiss Made

Lee Gatzke, retired Art Director

LARGE HANDS

1. Footprint 85 Series
2. Sorby Rosewood Handled
3. Marples Blue Chip
4. Swiss Made



Jan Svec (left) prefers a thicker handle than Jim Downing (right).

Judges' Comments:

Footprint 85 Series
The flattened oval shape has no sharp corners and fits comfortably in the hand. Even narrow sizes don't roll when you put them down.

Hirsch
Relatively skinny handles fit nicely into smaller hands.

Marples Blue Chip
Has good feel and balance. Another handle with a flattened oval shape. Not quite as roll resistant as the Footprint 565 Series.

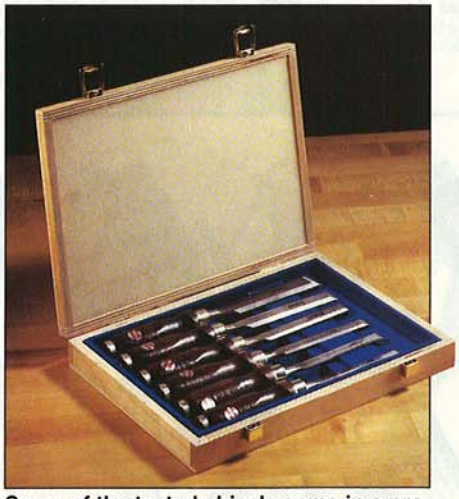
Nooitgedagt
Round handle has lip near shank to which you can gently apply pressure with your thumb and index finger.

Sorby Rosewood Handled
The length and thickness of the handle are just about perfect. Its round shape fits comfortably in your hand, but narrower chisels tend to roll.

Swiss Made
Good balance. The round handles have a bulge that fits comfortably in the hand. Its wood surface has no finish–I would finish it myself.

Two Cherries Plastic Handled
Has good feel and balance. Fits hand well for hand use or with mallet.

Woodcraft Butt Chisel
Not appropriate for mallet use. Short, stubby handles feel good in hand and help chisel fit into tight spots.



Some of the tested chisels come in a protective and showy wood box.

• *Packaging*

When doing tool reviews, we usually don't pay much attention to packaging. But when it comes to chisels, packaging makes a difference because a well-honed chisel needs a protective home. And we found big differences in packaging quality. Most of the chisels come in a soft plastic pouch, hard-plastic case, or cardboard box that adequately protects the tips during storage. The nicest packages were the wooden boxes like the one from Freud shown at *left*.

Continued

Chisels

We feel these chisels have an edge on the rest of the field

In the course of this review, we put our hands on a lot of really fine chisels. Making a choice was no easy task, and none of the chisels truly disappointed us. Nevertheless, the Swiss Made chisels stood at the head of the class. Not only were they made of the hardest steel we tested, they also showed the best consistency of hardness across the widths of their tips and from chisel to chisel. And no other brand matched the sharpness of their factory edges. Working with these chisels was a pure pleasure. The only improvement we would make is to add our own oil finish to their bare-wood handles.

Both of the Sorby chisels also were finely made with top-notch materials. And we really liked their thin edge profiles for cleaning up dovetails.

If the Swiss Made and Sorby chisels put too much strain on your wallet, don't be too concerned—we tested lots of other chisels that were nearly as good, but cost considerably less. In this group our favorites were the Ashley Isles chisels from Jesada and the German Bevel-Edged chisels from Woodworker's Supply.

If you're looking for a low-cost set that you can subject to abuse, the Stanley 16-902 chisels delivered good results overall. The Craftsman chisels proved the toughest of this lot because their blades were relatively hard from shank to tip. The unique Nicholson line of Woodchuck chisels have a top face that serves as a rounded rasp, the bottom face as a flat rasp—a handy combination at carpentry sites.

Swiss Made
WOOD MAGAZINE EDITORS' CHOICE PERFORMANCE 1998
Sorby Boxwood Handled
WOOD MAGAZINE EDITORS' CHOICE PERFORMANCE 1998
Sorby Rosewood Handled
Ashley Isles Beech Handled
WOOD MAGAZINE EDITORS' CHOICE VALUE 1998
Woodworker's Supply German Bevel-Edged
WOOD MAGAZINE EDITORS' CHOICE VALUE 1998

Written by Bill Krier
Product testing: Bob McFarlin
Photographs: Marty Baldwin
Illustration: Kim Downing

MANUFACTURER/IMPORTER	MODEL	HANDLE MATERIAL (1)	HANDLE SHAPE (2)	
ASHLEY ISLES	Beech Handled	W-BE	R	
BUCK BROS.	1040	P	R	
CRAFTSMAN	36857	P	ROF	
FREUD	WC Series	W-S	ROF	
FOOTPRINT	565 Series	W-BE	ROF	
	85 Series	P	ROF	
GARRETT WADE	Cabinetmaker's Set	W-BE	ROF	
HIRSCH	Hornbeam Handled	W-H	O	
MARPLES	Blue Chip	P	ROF	
	Splitproof	P	ROF	
NICHOLSON	Woodchuck	P	R	
NOOITGEDAGT	Wood Handled	W-BE	R	
SANDVIK	Wood Handled	W-BE	R	
SORBY	Boxwood Handled	W-BO	O	
	Rosewood Handled	W-R	R	
STANLEY	16-902	P	R	
	16-180	P	R	
SWISS MADE	--	W-H	R	
TWO CHERRIES	Wooden Handled	W-H	ROF	
	Plastic Handled	P	ROF	
WOODCRAFT	Butt Chisel	W-R	R	
	Private Labeled	W-S	R	
WOODWORKER'S SUPPLY	German Bevel-Edged	W-H	R	
	Rosewood Handled	W-R	R	

CUTTING-EDGE INFORMATION ON BEVEL-EDGE CHISELS

BLADE								PERFORMANCE (7)								
LENGTH (INCHES) (3)	LENGTH (INCHES)	FINISH (4)	BEVEL ANGLE	MICRO BEVEL (Y) YES, (N) NO	BEVEL GRIND (5)	EDGE GRIND PROFILE (6)	STORAGE ACCESS. INCLUDED WITH SETS (8)	HAND USE	HANDLE COMFORT: MALLET USE	HANDLE COMFORT: BALANCE	FACTORY SHARPNESS	EASE OF SHARPENING	STRIKING DURABILITY	STRIKING RECOIL	APPROX. STREET PRICE FOR A 1/2" CHISEL (9)	COUNTRY OF MANUF. (10)
6 1/8	5 5/8	O	24°	N	H	B	Plastic Pouch	F	E	G	E	E	G	E	$15	E
3 5/8	4 3/4	O	25°	N	H	B	Plastic Rack *	F	G	F	G	G	E	G	8	U
5 1/8	4 1/8	None	34°	N	H	C	Plastic Pouch	F	G	F	G	G	E	G	6	U
5	4 1/2-5 3/8	O	24°	N	F	B	Wood Box	F	G	G	F	G	F	G	10	I
4 7/8	5 3/4	PL	26°	Y	H	B	*	G	G	G	G	G	F	G	11	E
4 1/4	5 3/4	O	25°	Y	H	B	Plastic Pouch *	G	G	G	G	E	E	G	10	E
5	4 5/8-5 3/8	O	24°	Y	F	B	Wood Box	F	G	G	P	F	F	G	10	C
5 1/4-6	5 1/4-6	M/PL	26°	N	H	B	Plastic Pouch	E	F	G	G	G	E	G	20	G
4 3/4	5-7	O	25°	Y	H	B	Wood Box *	G	G	G	G	E	G	G	11	E
4 3/4	5-7	O	25°	Y	H	B	Wood Box *	F	G	G	G	E	E	G	14	E
3 3/4	4 1/4	None	31°	N	F	C		F	G	F	G	G	E	G	10	U
4 3/4	4 3/4	PL	25°	N	F	C	*	F	F	G	G	F	G	F	10	H
5 1/4	5 5/8	O	25°	N	H	B	Cardboard Box *	F	G	G	G	F	G	G	19	S
5 1/2	4 7/8-5 1/8	O	22°	N	H	A	Cardboard Box *	G	E	E	G	E	G	G	25	E
4 1/2	5 5/8	O	22°	N	H	A	*	E	G	G	E	E	P	F	30	E
4 1/2	4 1/4	PL	28°	N	H	C	Plastic Case	F	G	F	G	F	E	E	9	U
3 1/2	4 1/4	PL	28°	N	H	C		F	G	F	G	F	E	E	7	U
5 3/8	4 3/4-6	O	25°	Y	H	B		E	G	E	E	E	G	G	20	SZ
4 3/4-5 1/4	5 1/4-5 3/4	M/PL	27°	N	H	B	Plastic Pouch	G	G	G	G	G	G	G	19	G
4 1/4-4 5/8	5 1/4-5 3/4	M/PL	30°	N	H	B	Plastic Pouch	F	G	G	G	G	E	G	19	G
2 1/2	3 1/2	M/O	28°	N	F	B	Cardboard Box *	G	P	G	F	G	N/A	N/A	14	E
5	6	O	25°	N	H	C	*	G	E	G	G	G	G	G	15	H
5 1/4	5 3/8-5 3/4	M/PL	25°	N	H	B	Cardboard Box	G	G	E	G	E	G	E	10	G
5 1/2	4 3/4-5 1/2	M/O	25°	N	H	B	Cardboard Box	E	G	G	F	E	P	F	14	E

NOTES:

1. (P) Plastic
   (W-BE) Wood - Beechwood
   (W-B) Wood - Boxwood
   (W-H) Wood - Hornbeam
   (W-R) Wood - Rosewood
   (W-S) Wood - Species unknown
2. (O) Octagonal
   (R) Round
   (ROF) Round or oval with flattened areas
3. Measured from end of handle to end of ferrule.
4. (M/O) Mirror polish with oil coating
   (M/PL) Mirror polish with plastic coating
   (O) Oil coating
   (PL) Plastic coating
5. (F) Flat grind
   (H) Hollow grind
6. (A) Thin profile for length of blade
   (B) Thin tapering to thick
   (C) Thick for length of blade
7. E Excellent F Fair G Good P Poor
   (N/A) Not applicable
8. (*) Includes plastic tip protectors
9. Some chisels are available in sets only. For chisels not available individually, we calculated an average price per chisel.
10. (C) Czechoslvakia
    (E) England
    (G) Germany
    (H) Holland
    (I) Italy
    (S) Sweden
    (SZ) Switzerland
    (U) United States

Where to call for more information:

Ashley Isles
Available from Jesada Tools at 800/531-5559

Buck Bros.
Available at Home Depot

Craftsman
Available at Sears

Freud
For a dealer near you call 800/472-7307

Footprint
For a dealer near you call 905/564-6007

Garrett Wade
Available at 800/221-2942

Hirsch
Available from Highland Hardware at 800/241-6748

Marples
For a dealer near you call 905/428-1077

Nicholson
For a dealer near you call 919/387-0099

Nooitgedagt
Available from Constantine's at 800/223-8087

Sandvik
For a dealer near you call 800/828-9893

Sorby
Available from Garrett Wade at 800/221-2942 and Woodcraft at 800/535-4482

Stanley
For a dealer near you call 800/648-7654

Swiss Made
Available from Woodcraft at 800/535-4482

Two Cherries
For a dealer or mailorder source call the Robert Larson Co. at 800/356-2195

Woodcraft
Available at 800/535-4482

Woodworker's Supply
Available at 800/645-9292

Cool Carrier For A Hot Dish

A sure winner on the oven-to-table run

Getting that lovely lasagna or comfort-food casserole from the oven to the table poses one problem: How to serve up a too-hot-to-handle dish. Here's a simple-to-make casserole carrier that solves the problem, and looks good doing it, too.

Note: *Our holder takes a 9×13" Pyrex baking dish. You can modify it to accommodate other styles or sizes.*

Pattern the pieces, drill some holes, and cut out the bases

1 Cut two ½×2 11/16×16¼" pieces of maple for the base and two ½×2½×7" pieces of cherry for the handles.

2 Photocopy the Full-Size Handle and Base patterns. You'll find them in the *WOOD PATTERNS®* insert in the back of the magazine. Make two copies of the Handle pattern.

Adhere the Base pattern to one of the maple blanks, using spray adhesive. (Follow the manufacturer's instructions for temporary bonding.) Adhere the Handle patterns to the handle blanks the same way.

3 Bore the counterbores in the base blanks where shown. To do this, transfer the counterbore centerline to the edge of the patterned blank.

Then, chuck a ⅜" Forstner bit in your drill press, and position a fence on the drill-press table to center the bit on the edge of the blank. Clamp a stopblock to the fence to center the bit over the mark. Bore the counterbore to ⅜" deep, and set the drill-press depth stop. Now, drill the remaining three counterbores, as shown in *Photo 1* on the *opposite page*.

4 Center an 11/64" hole in each counterbore. To drill these holes, leave the fence and stopblock where you set them to drill the counterbores—just change the bit in the drill press.

5 Bore counterbores in the handles, and drill screw holes through them where indicated on the pattern.

6 Temporarily laminate the base blanks with double-faced tape, placing the patterned piece on top. Keep the edges flush and the counterbored edges together.

7 Bandsaw the bases, as shown in *Photo 2*. Cut slightly outside the line; then sand to the line with a drum-sander. Separate the parts.

Scrollsaw the handles, and complete the carrier

1 Scrollsaw the design on each handle, as shown in *Photo 3*. To do so, drill 1/16" blade start holes inside the cutout areas on each handle. Then, insert the scrollsaw blade through each hole in turn, and make the inside cuts. (We sawed the designs with a #4 blade, .035×.015" with about 18 teeth per inch. We cut out the leaves first, then cut out the stems.)

2 Scrollsaw or bandsaw the handles to shape. Sand the sawn edges smooth, as necessary. Remove the pattern.

3 Rout a ¼" round-over along the top edge of each handle (the side with the counterbores). A table-mounted router does the job safely and easily, as shown in *Photo 4*.

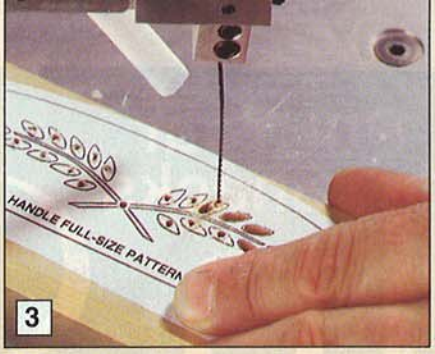
4 Finish-sand all parts, using progressively finer grits from 100 to 220.

5 Shorten four #8-32×3" flathead machine screws to 2⅞". To shorten them, thread a nut onto the screw first. Then, cut the screw with a hacksaw. Remove the nut to clean up the thread at the cut.

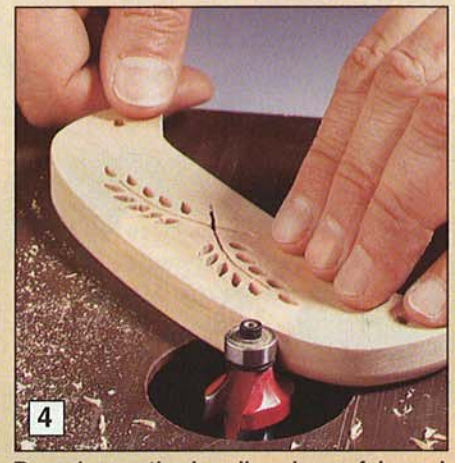
6 Press a #8-32 nut into each base counterbore. To do this easily, thread the nut about halfway onto one of the

A fence and stopblock on your drill press will locate the counterbores and holes in the base accurately.

Bandsaw both bases at once by laminating the blanks with double-faced tape.



Scrollsaw the handle pattern first; then cut the handle to shape.



Round over the handle edge safely and easily on a table-mounted router.

Tap nuts into the base counterbores to ease assembly.

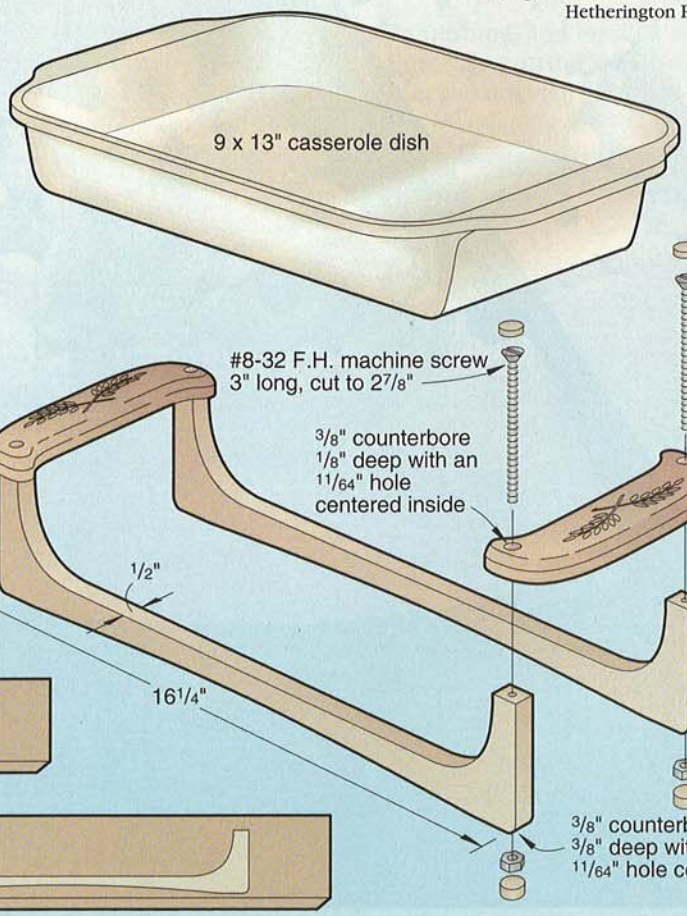
Clamp the bases to hold them square while assembling the carrier.

#8-32 machine screws. Pilot the end of the screw into the hole through the base; then push the screw head to seat the nut in the counterbore. (We drove ours in with a tap from a deadblow mallet, as shown in *Photo 5*.) Remove the screw.

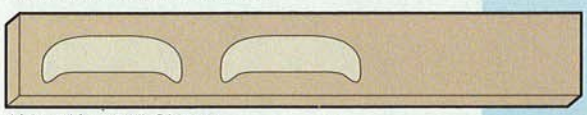
7 Assemble the handles and bases, as shown in the Exploded View drawing. To keep all the parts square, cut a scrap of ½" plywood 4¾" wide by about 11" long. Stand a base alongside each edge of it, align the ends of the bases with a framing square, and clamp the bases, as shown in *Photo 6*. Then apply glue to the base tips, and screw on the handles. Keep the assembly clamped until the glue dries.

8 Plug the base and handle counterbores. Sand the plugs smooth; then apply a durable clear finish, such as a semigloss polyurethane.

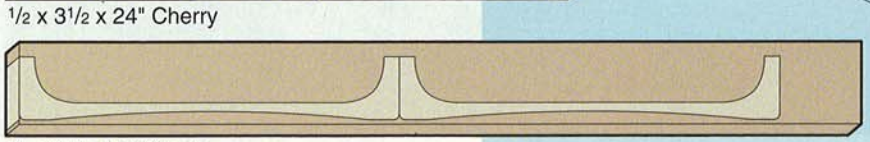
Project Design: James R. Downing
Illustrations: Roxanne LeMoine; Lorna Johnson
Photographs: Baldwin Photography; Hetherington Photography



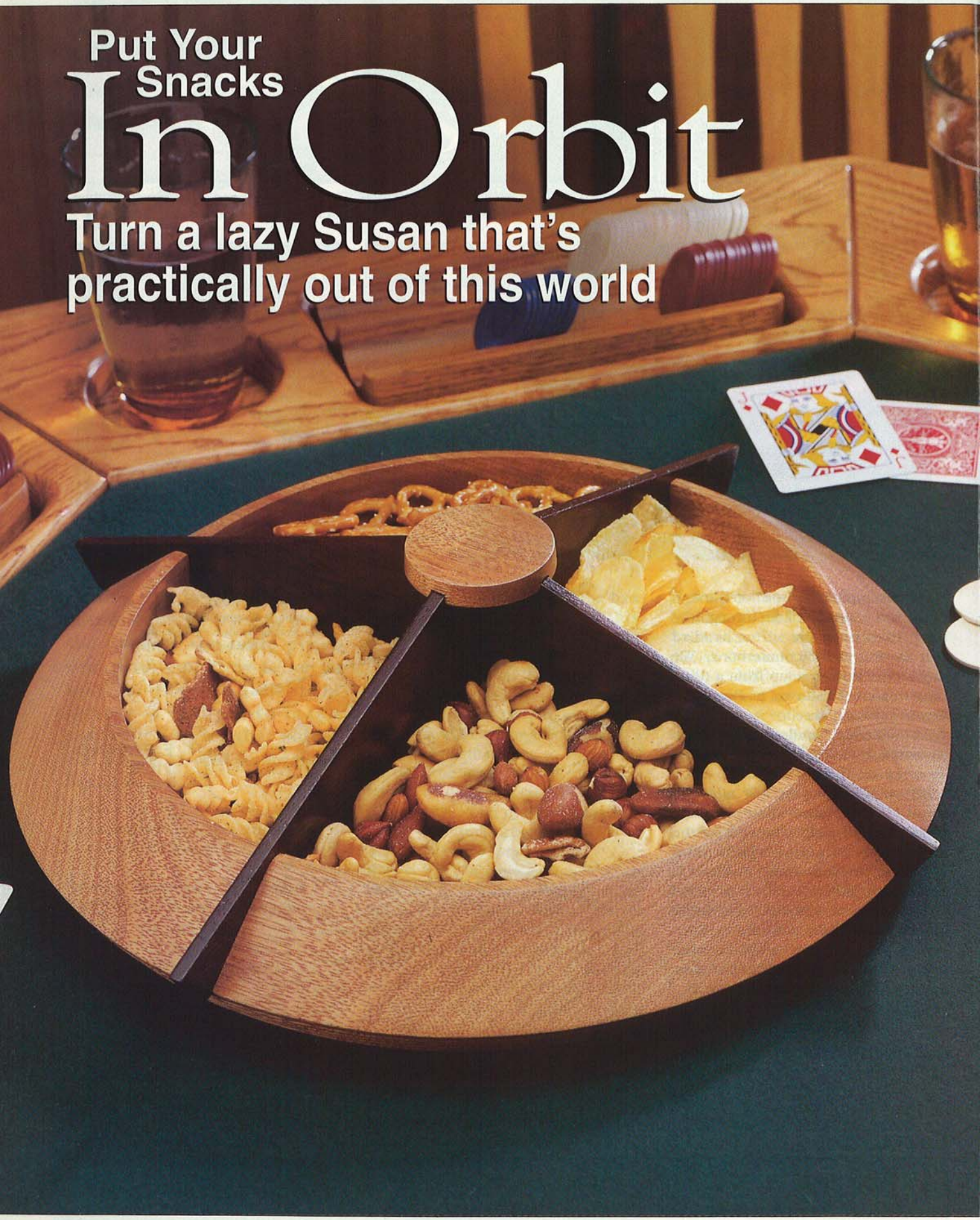
CUTTING DIAGRAM



1/2 x 3 1/2 x 24" Cherry



1/2 x 3 1/2 x 36" Maple



Put Your Snacks In Orbit

Turn a lazy Susan that's practically out of this world

Though it brings to mind extraterrestrial objects, such as space stations and flying saucers, our turned lazy Susan boasts down-to-earth practicality. At any gathering, you only have to fill the four compartments with snacks, and this beauty becomes the center of the universe.

Turn the bowl in the body

***Note:** If your lathe won't swing 15"-diameter work over the bed, you can turn outboard (if your lathe permits) or scale down the turning.*

Locate the center on one face of your 2×15×15" mahogany stock. Draw a centered 15" circle on the stock, and bandsaw the blank.

Chuck the blank so the surface that will be the top of the lazy Susan faces out. (See the box at the *right* for a hint on chucking lathe work.) If you don't have a lathe chuck, glue a wasteblock to the back face of the blank, and screw your faceplate to it.

Adjust your lathe to a slow speed, around 400–500 rpm. Turn the blank to 14¼" diameter, and true the face.

Hold a pencil against the face of the spinning blank 1¾" from the edge. Inside the circle drawn, form a flat-bottomed bowl 1¼" deep. A bowl gouge and a heavy scraper will accomplish the job. Slope the side slightly inward at the bottom, and curve it into the bottom as shown on the Section View drawing.

Draw another circle on the face, this one 1½" from the edge. Then draw a line around the edge of the blank 1¼" from the face. Form a sloped surface between these lines, as shown in *Photo A, next page*. You can rough it out with a gouge, and clean it up with a bowl scraper.

Make a clean-up cut along the flat surface between the sloped face and the bowl. Sand the interior, the sloped face, and the top. Maintain fairly sharp edges for a crisp look.

Continued

You'll need. . .
Stock: Mahogany, 2×15×15" (or narrower stock edge-glued to this size) and ¾×2½×2½", one piece each size; wenge, two pieces ¼"×3½×18".
Lathe equipment and tools: Chuck, faceplate, ½" bowl gouge, parting tool, bowl scraper, 1" skew.

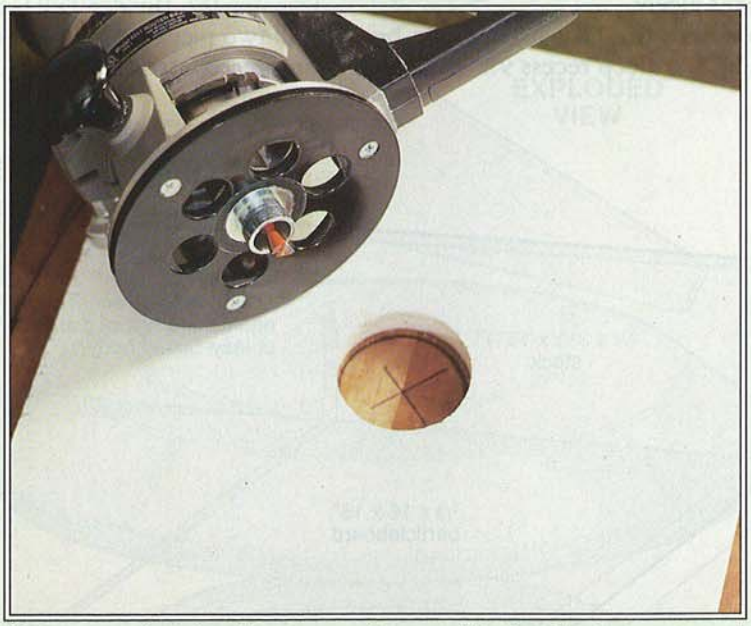
Get off to a quick start by routing a recess for the chuck

Jerry Selover, a Des Moines woodworker who turned our lazy Susan, showed us how to save a few steps when mounting a blank on an expanding-jaw woodturning chuck.

The method relies on a routing template made from a piece of ½"- or ¾"-thick plywood or particleboard. (A piece about 12" square would be about right.) At the center of the piece, bore a hole that's a little larger than the diameter of the dovetail recess required for your chuck jaws. (The hole needs to be large enough, that when used with your guide bushing and dovetail bit, you can rout a recess of the proper size. A 2½" hole in our template produces a dovetail recess that's 2⅜" in diameter.) Bore the hole with a circle cutter or holesaw to ensure a smooth edge.

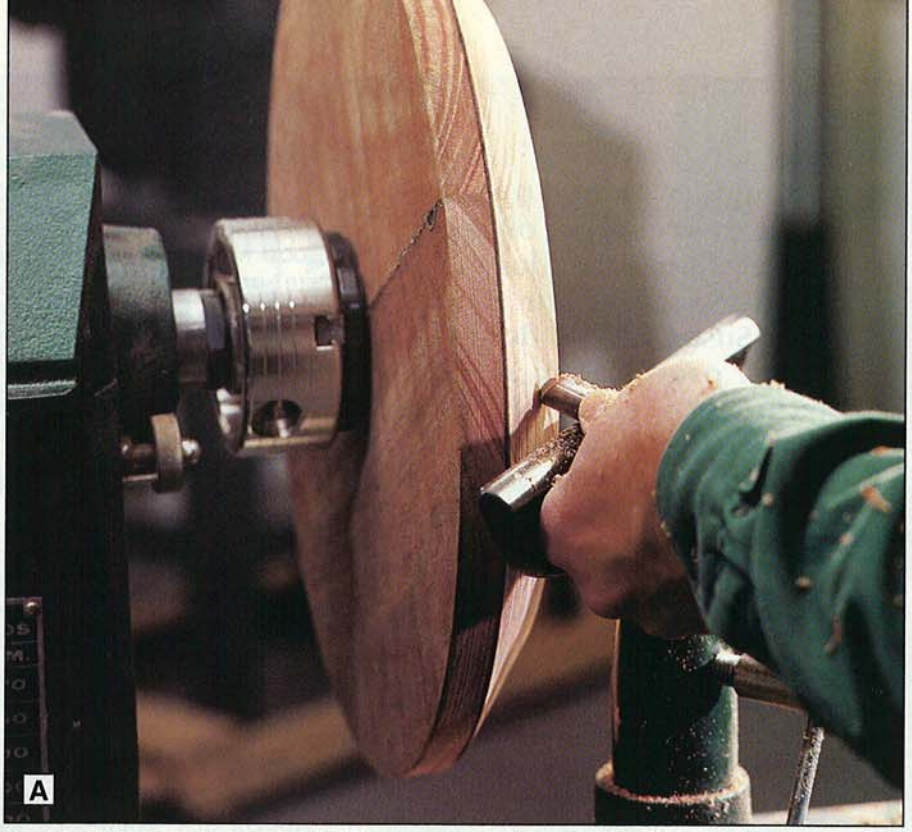
To prepare a blank for mounting, draw a circle the size of the template's hole at the center on one side of the blank. Position the template on the blank, locating the hole over the drawn circle, as shown *below*. Clamp the template to the blank or secure it with double-faced tape.

Fit your router with a pattern bushing, and install a dovetail bit, as shown in the photo. Adjust the cutting depth to suit the chuck's requirement. Then, rout the dovetail recess in the blank, guiding around the inside of the template hole.



You can rout a chucking recess in your blank using a scrapwood template and a template bushing on your router. Rout the recess with a dovetail bit.

Put Your Snacks
In Orbit



Run the lathe at a slow speed, 500 rpm or less, when turning the chamfered top edge. The guideline on the edge shows the chamfer's limit.

Kerf the body for the dividers; then turn the bottom recess

Saw two ¼" kerfs 90° apart across the diameter of the turning, using a dado blade and tablesaw. Set the cutting depth to make the kerfs ⅛" deep across the center of the bowl. To saw the kerfs safely and accurately, build a fixture like the one shown in the illustration *below*. Saw the kerfs as shown in *Photo B*.

Next, turn the bottom of the bowl, using a jam chuck like the one shown in *Photo C*. To make the chuck, attach a 1½"-thick, 12"-diameter disc to your lathe faceplate. (We laminated two pieces of ¾" particleboard scrapwood for the one shown.)

True the face and edge. Then turn the disc to fit snugly into the bowl recess. Fit the lazy-Susan body squarely over the jam chuck. Bring up the tailstock to stabilize the turning.

Draw a line on the bottom face ½" from the edge of the body. Referring to the Section view, form a sloped surface between the line and the lower edge of the top face. Draw four equally spaced lines along the sloped lower surface, and cut the V-grooves where shown on the half-pattern. The tip of a skew forms the grooves nicely.

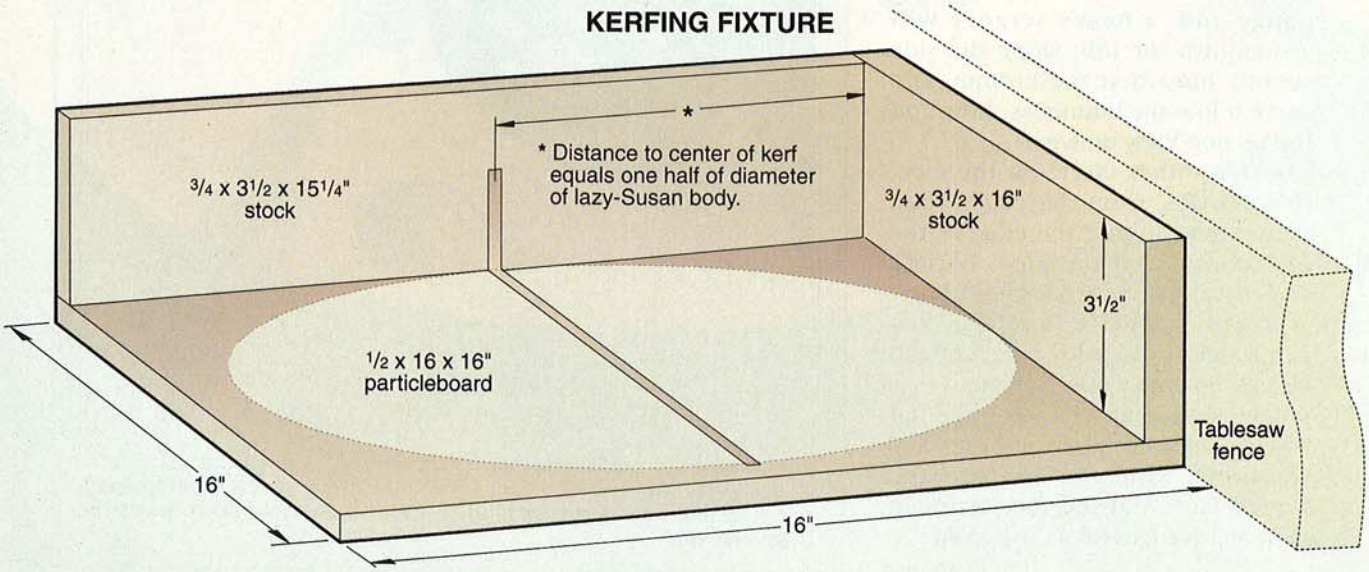
Complete the lazy-Susan body by turning a ¼"-deep recess 9⅝" in diameter to receive the lazy-Susan bearing. Work as close to the tailstock center as possible; then slide the tailstock back to complete the recess. Sand the bottom of the body. Dismount the body from the lathe.

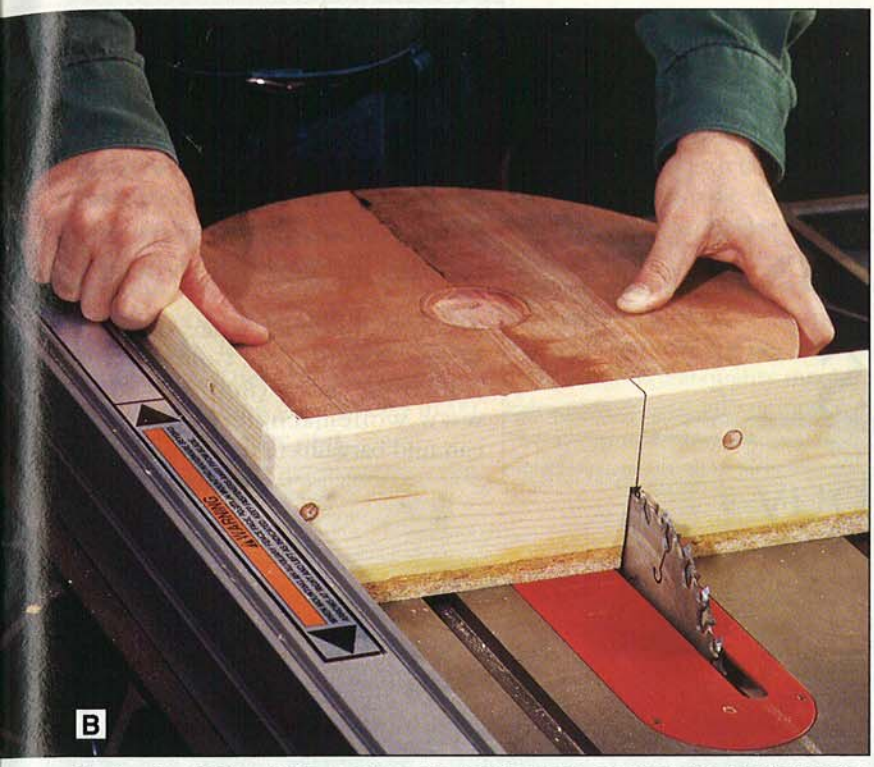
Install the winged dividers, and cap them with a turned knob

Transfer the Divider Full-Size Pattern onto two pieces of ¼"-thick wenge (or another contrasting stock). Lay out one divider with a notch from the top and the other with a notch from the bottom. Scrollsaw or bandsaw the parts, staying slightly outside the lines. Sand to the pattern lines. Fit the dividers into the kerfs in the body, and glue them into place.

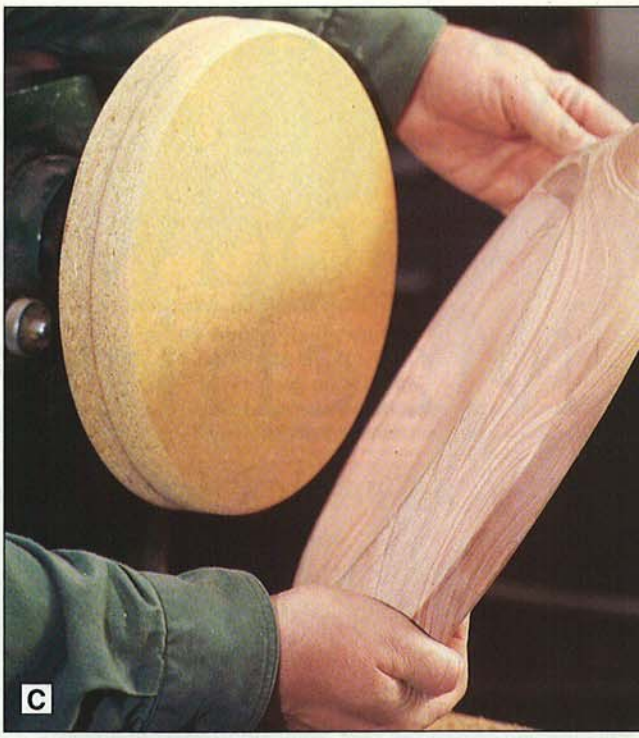
Now, turn the knob that will sit atop the junction of the two dividers. To do this, attach a scrapwood waste-block about 1½" thick to your 3-4" lathe faceplate. Turn a 2¼"-diameter

KERFING FIXTURE


*
* Distance to center of kerf equals one half of diameter of lazy-Susan body.
¾ x 3½ x 15¼" stock
¾ x 3½ x 16" stock
3½"
½ x 16 x 16" particleboard
Tablesaw fence
16"
16"



A simple sliding table carries the body when cutting the kerfs for the dividers. Saw the kerfs with a ¼" dado blade.



Fit the partially turned body over a jam chuck so you can tur the chamfered bottom corner and the bearing recess.

tenon about ¾" long on the face of the wasteblock.

Bandsaw a 2¼"-diameter disc from ¾"-thick mahogany. Glue the disc to the tenon on the wasteblock. Then, turn the disc to 2" in diameter, form the knob, sand it, and part it off.

Install a ¼" straight bit in your table mounted router. Then, employing a sled fixture similar to the one used to kerf the lazy-Susan body, rout two grooves ⅛" deep across two diameters 90° apart on the bottom of the knob. Glue the knob to the dividers.

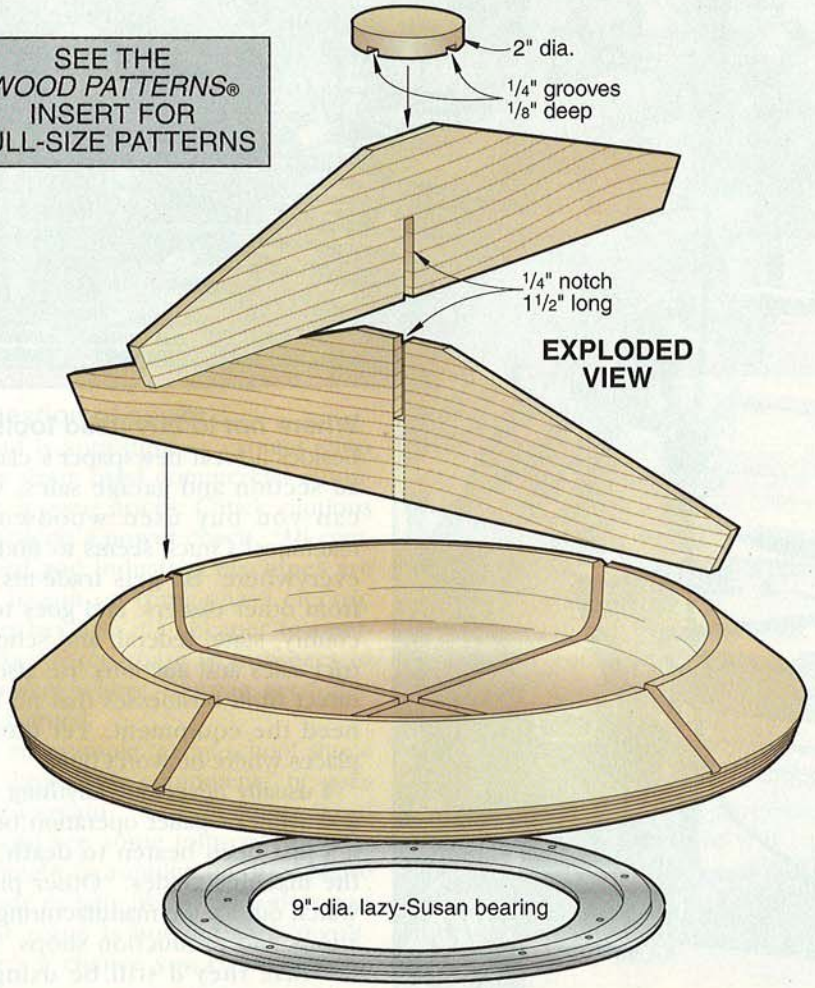
It's about time for a spin

Apply a clear finish. (We sprayed on several coats of lacquer, sanding with 320-grit sandpaper between coats.)

Position the lazy-Susan bearing in the recess on the bottom of the body. Take care to center the bearing. Mark the locations for the bearing's mounting screws, and drill pilot holes for the screws. Be careful not to drill through into the bowl. Screw the bearing to the body, driving in the screws slowly to make sure they don't poke through.

Project Design: Jan Svec
Photographs: Steve Struse; Hetherington Photography
Illustrations: Roxanne LeMoine; Lorna Johnson
Lazy Susan turned by Jerry Selover

SEE THE *WOOD PATTERNS*® INSERT FOR FULL-SIZE PATTERNS

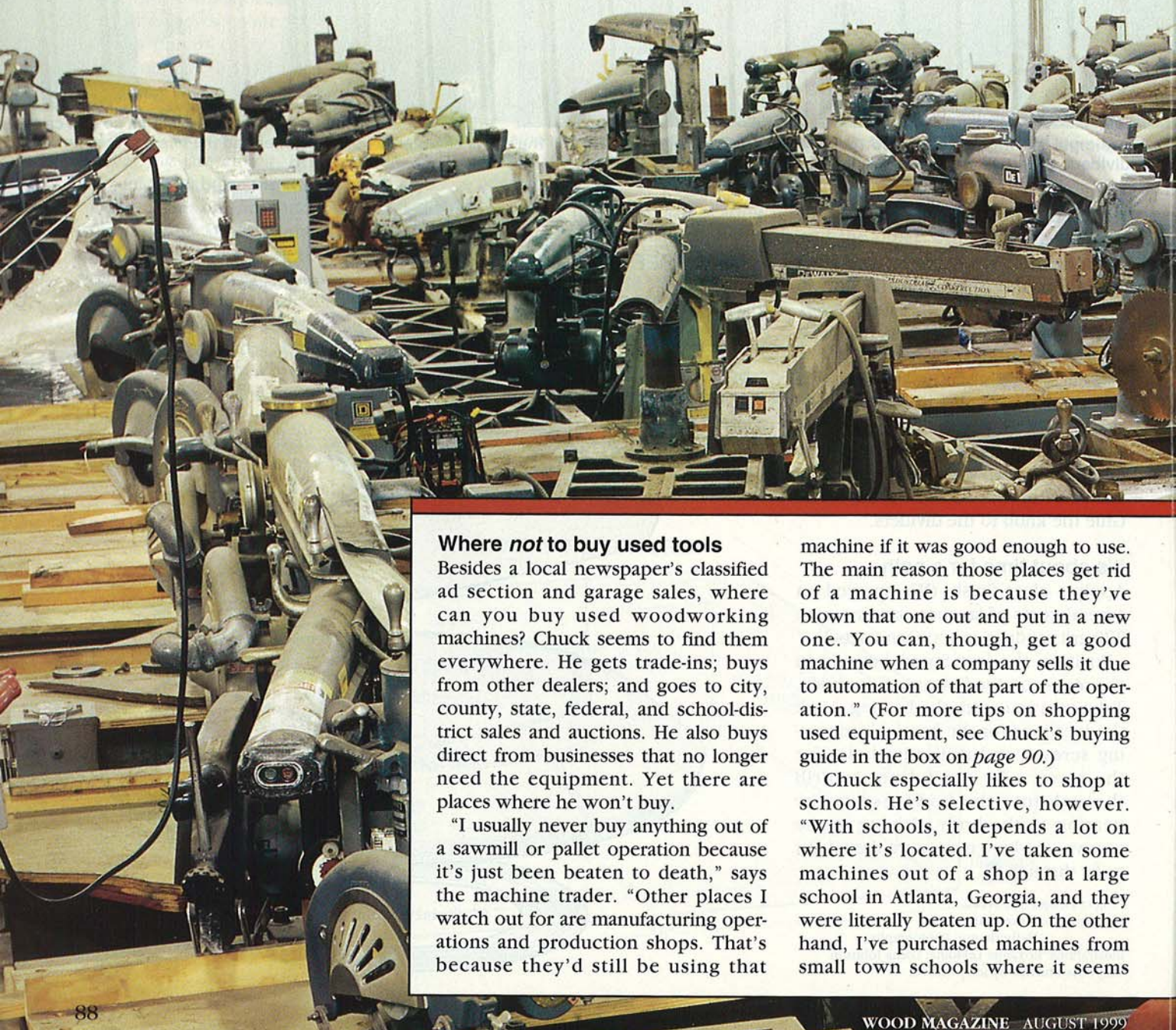


FOR SALE: Well-Aged Woodworking Machines

If you're looking to buy one, read this first

Maybe you've dreamed of stepping up to a heavier-duty woodworking machine through the "used" route. It's possible, but beware the pitfalls, advises our expert.

According to Chuck Wolfe, owner of Wolfe Machinery Company in Johnston, Iowa (800/345-6659, www.wolfemachinery.com), you can find bargains in used woodwork-



Where *not* to buy used tools

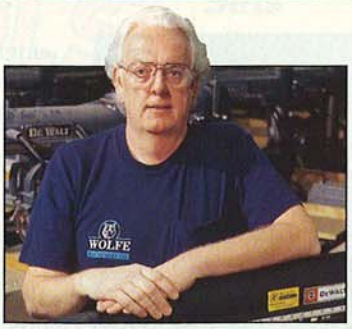
Besides a local newspaper's classified ad section and garage sales, where can you buy used woodworking machines? Chuck seems to find them everywhere. He gets trade-ins; buys from other dealers; and goes to city, county, state, federal, and school-district sales and auctions. He also buys direct from businesses that no longer need the equipment. Yet there are places where he won't buy.

"I usually never buy anything out of a sawmill or pallet operation because it's just been beaten to death," says the machine trader. "Other places I watch out for are manufacturing operations and production shops. That's because they'd still be using that machine if it was good enough to use. The main reason those places get rid of a machine is because they've blown that one out and put in a new one. You can, though, get a good machine when a company sells it due to automation of that part of the operation." (For more tips on shopping used equipment, see Chuck's buying guide in the box on *page 90.*)

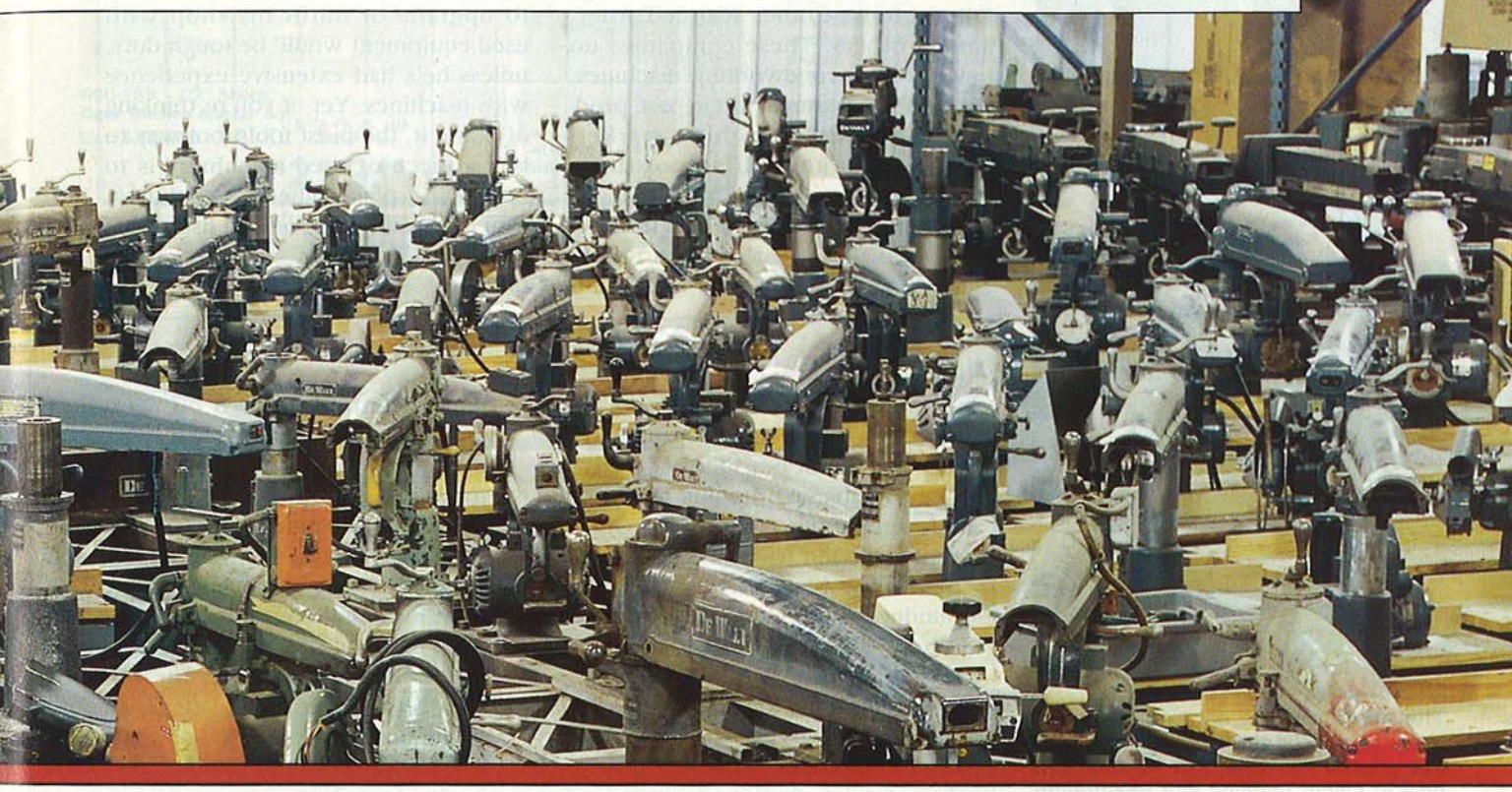
Chuck especially likes to shop at schools. He's selective, however. "With schools, it depends a lot on where it's located. I've taken some machines out of a shop in a large school in Atlanta, Georgia, and they were literally beaten up. On the other hand, I've purchased machines from small town schools where it seems

ing machines. But you also can spend as much as a new one costs getting an old one in good working order. Of course, it's Chuck's business to rebuild used woodworking machinery and resell it. And he has the shop, equipment, and skilled personnel to do it. As a result, his customers pay two-thirds of what they'd pay for comparable new equipment. They get a warrantee, too. If something goes wrong in 90 days, he'll take care of it.

Most woodworkers wanting to upgrade through used equipment don't have Chuck's first-hand knowledge acquired over 20 years, or the backup to handle major repairs. Nevertheless, knowing what to look out for—and how and where to buy—can help even the novice used-machine shopper. And Chuck's advice applies not only to the commercial-quality machines he deals with, but all stationary woodworking machines.



Chuck Wolfe began fixing woodworking machines as a kid when he worked for his dad, who dealt in DeWalt radial-arm saws like the vintage ones shown *below*.



the kids were taught to take care of things. So I evaluate the area."

Almost a sure bet for finding good used machines is a two-man cabinet shop, says Chuck. "You can usually count on the machines being well-maintained until they're upgraded. No matter where you find them, though, if a machine has been pulled from service and is gathering dust, be wary. If a guy has a woodworking shop, and he's not using the machine anymore, it's probably worn out."

Even used machinery dealers sometimes try to pass on a problem, according to Chuck. "Beware of the pretty paint job, because it might be all that was done. In the business I'm in, it's called a 'DuPont rebuild.' "

A question of power

The ad is appealing—a cabinet shop offers some used commercial equipment at great prices. Chuck cautions that you do a power check. "All commercial and industrial machines are built to run on three-phase electric power because it's cheaper to operate. And three-phase is an aspect of machinery where you can get financially burned.

"As an example, many school shops have three-phase equipment," he goes on to explain. "You go to a school sale and see some jointers for sale. One might be running on three-phase and one exactly like it in another part of the room is hooked to 220-volt. There's a chance you could buy the wrong one for the electric service you have. So always check the electrical requirements of the machine you're thinking of buying," he says. "If you don't have three-phase power or don't want to convert, the machine is no good to you."

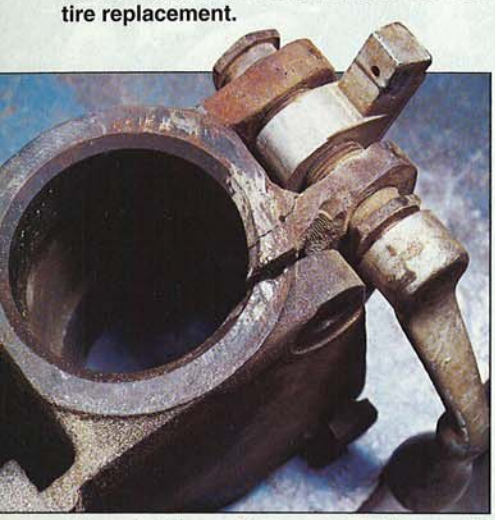
How can you tell if you're looking at three-phase equipment? "If the motor has a plate," says Chuck, "it should read 'three-phase' or 'poly-phase.' If there's no plate, look at the wires going to the motor. A three-phase motor will have three hot wires and a ground wire. Single-phase will have only two hot wires and a ground."

What about simply swapping the three-phase one on the machine for a

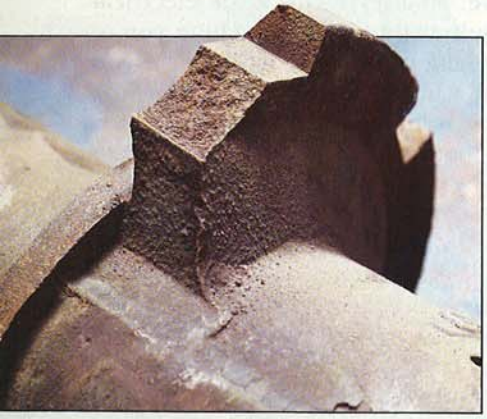
Continued

Well-Aged **Woodworking Machines**

Every bandsaw has rubber tires on the upper and lower wheels that drive and track the blade. Worn rubber spells blade wander and the difficult task of tire replacement.



The crack on this cast collar won't allow it to fully close. You often can't see cracks like this, but wobble and play in clamp handles and positioning locks indicate the possibility on any used machine.



You won't be able to spot a chipped indexing ring tooth like this on a radial-arm saw. But if the arm doesn't lock in a miter position, you can bet it has one.

Written by Peter J. Stephano
Photographs: Hetherington Photography

single-phase motor? "There are lots of problems with that," Chuck responds. "Some old machines have a specialized space that the motor fits into, so you have to find one that fits. You just can't buy a substitute of the same dimensions and horsepower off the shelf somewhere." (More questions about three-phase power? See the box, *bottom of the page.*)

Even name brands made Edsels

You've probably heard the old manufacturers' names—Crescent, Moak, Oliver, Boise-Crane, Walter-Turner, among others. These companies no longer build woodworking machines, but you'll run across their past products in the used-machine market. How do you know if any of these brands-of-old are a good buy?

"It would be inaccurate and misleading to develop a list of good brand-name manufacturers who once built woodworking equipment because quality varied by type of machine and model," Chuck explains. "It's impossible to say that every model radial-arm saw that DeWalt built was good, or all Craftsman tablesaws built before the year XX are great, because it's just not true. Remember, Ford built the Edsel and Chevrolet the Corvair.

"Buying used woodworking machines is an art form that you have to learn, like trading in cattle, horses, or used cars," he emphasizes. "For a hobby woodworker to go out and try to upgrade or outfit his shop with used equipment would be tough duty, unless he's had extensive experience with machines. Yet, if you're thinking of doing it, the most foolproof way to buy a piece of used machinery is to buy it at a place where it's running. You can start it up, you can listen to it run, you might even be able to put a board through it."

Chuck's buying guide for used-machinery

- If possible, start up the machine and listen to it run. A siren-like screech indicates bad motor bearings.
- With a tablesaw, unplug the machine and remove the table insert. Grab the arbor shaft and try to wiggle it to see if there's any play. Check the belts for soundness and the pullies for rigidity.
- Check a bandsaw's blade guides for degree of wear. Also open the upper and lower doors to see if the tires—the rubber that covers the wheels—are dried, cracked, or badly worn, as in the photo *top left*. Re-tiring isn't expensive, but difficult.
- Unlock and move the arm of a radial-arm saw to its various positions. Failure to lock solidly or not lock at all indicates a chipped tooth on the miter index ring and/or a cracked casting on the index clamp, as shown in the photos *left*.
- Inspect all machines for obvious cracked castings, ill-fitting fences, and handles that are missing or broken.
- Over-use and abuse to a joiner, tablesaw, or thickness planer shows up as numerous scratches on the table or bed. If the roller on a planer is smooth in the middle but knurled on the edges, it's machined lots of lumber and could be due for failure.
- No matter who you buy from, look at any machines still in use. If they appear worn and ill-maintained, don't expect what they're selling to be any better.

Is three-phase power out of the question?

Suppose you have a chance to get a really good deal on a commercial tablesaw, but it's three-phase. What does it take to convert it to normal household electrical current?

Chuck has an answer. "You can convert three-phase to run on 220-volt current single-phase—but not 110-volt—with a 'phase shifter.' A small phase shifter to run just one machine costs about $200," he points out. "Most of the old three-phase motors that are large in diameter and short in length will work on a phase shifter. But if the motor is real small in diameter and long, it has to have a much more expensive ($1,000 to $1,500) rotary-type phase converter.

"A hobby woodworker could run a three-phase machine, like a commercial tablesaw, with a phase shifter," Chuck continues, "because the saw wouldn't be in continual use. But in production, it's easy to burn up a three-phase motor using a phase shifter. And that could mean as much as a $1,200 loss."

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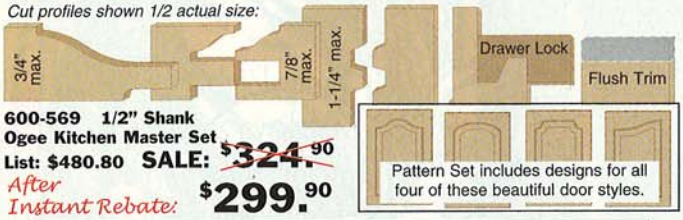

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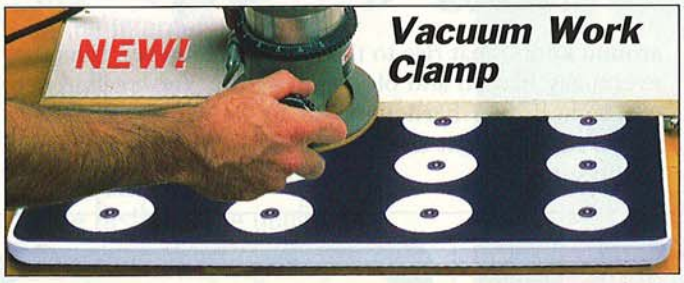

Many routine workshop tasks are complicated by the simple fact that you have to clamp the workpiece to the bench, and clamps get in the way! That's not a problem with our Vacuum Work Clamp! You simply place the Work Clamp on a flat bench and connect your shop vac hose. Turn on the vacuum and the clamp is virtually locked to the bench. Next place any flat workpiece on top of the Clamp and the vacuum "hold-down" feature is automatically activated. The secret lies in the stainless steel ball valves located on the Work Clamp's top surface. Each valve is located in a recessed portion of the top. When your workpiece presses down on the spring-loaded valve that recess becomes a vacuum chamber that holds the work in place. The size of your workpiece determines how many valves are activated. Unused valves remain closed to maintain the greatest possible vacuum pressure. Milled from heavy plastic, the Work Clamp measures 15" x 23" and includes 16 ball valves, a master shut off valve and an adapter for 1" to 1-3/8" vacuum hose.

VWC-001
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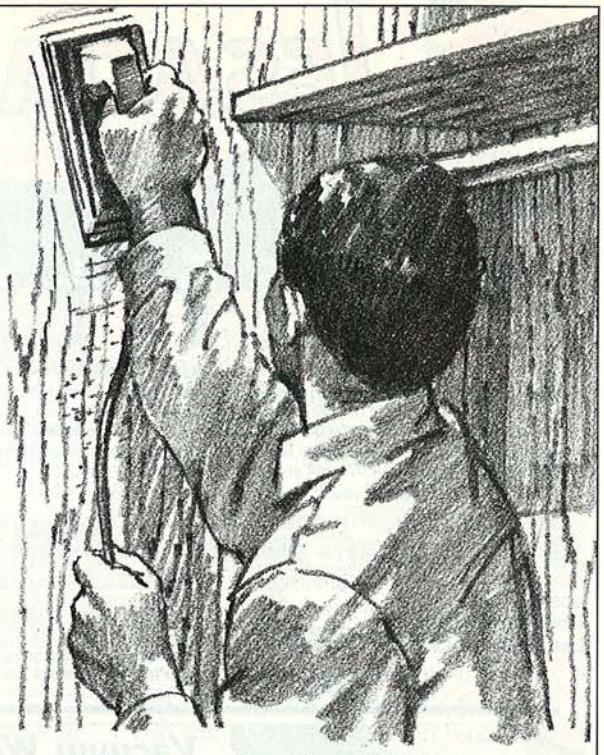
How to keep red cedar aromatic

I have a cedar-lined closet that has lost is fragrance. Does this mean it has lost its insect repellent capabilities as well? Is there a way to restore the aromatic fragrance?

—Dennis Yeager, Corona, Calif.



Dennis, recent studies show that the fragrance of cedar does indeed repel moths and certain cloth-eating beetles. What smells aromatic to us seems quite repulsive to these insects.

For the fragrance to escape, the wood should never be sealed with a finish. Even so, unfinished cedar will lose its aroma over time. That's because the cedar fragrance comes from oils within the wood (especially around knots) that rise to the surface. However, the oils eventually harden and block the path of fresh oils. You can remove the hardened oils by lightly sanding the wood with 220-grit sandpaper. Fresh oil will again rise to the surface.

Continued on page 94

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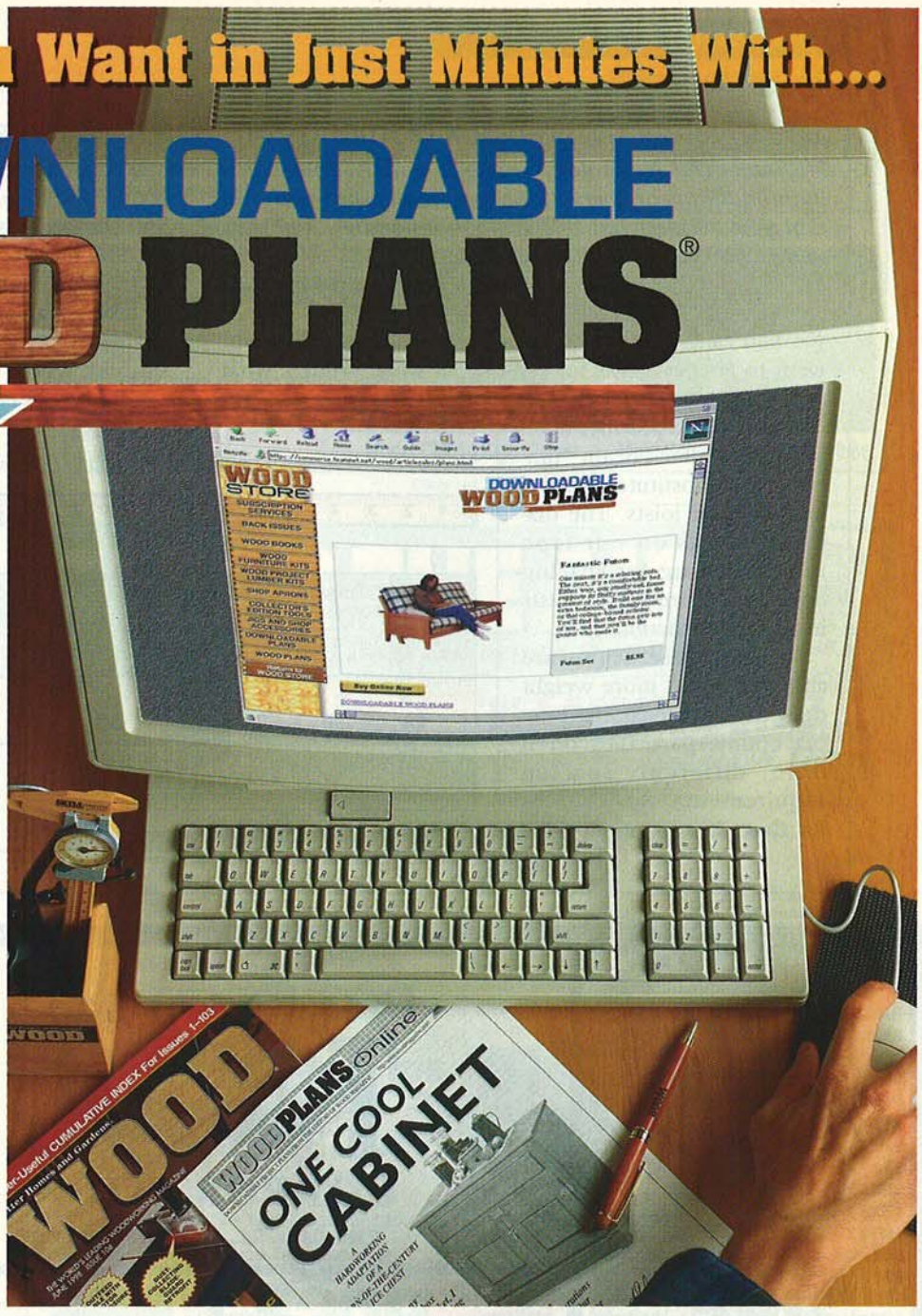

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Continued from page 92

The mystery of the black diamonds on tape measures solved

My industrial technology students noticed that black diamonds appear every 19 3/16" on metal tape measures. Can you tell us what this symbol designates, and why they're marked at such odd intervals?

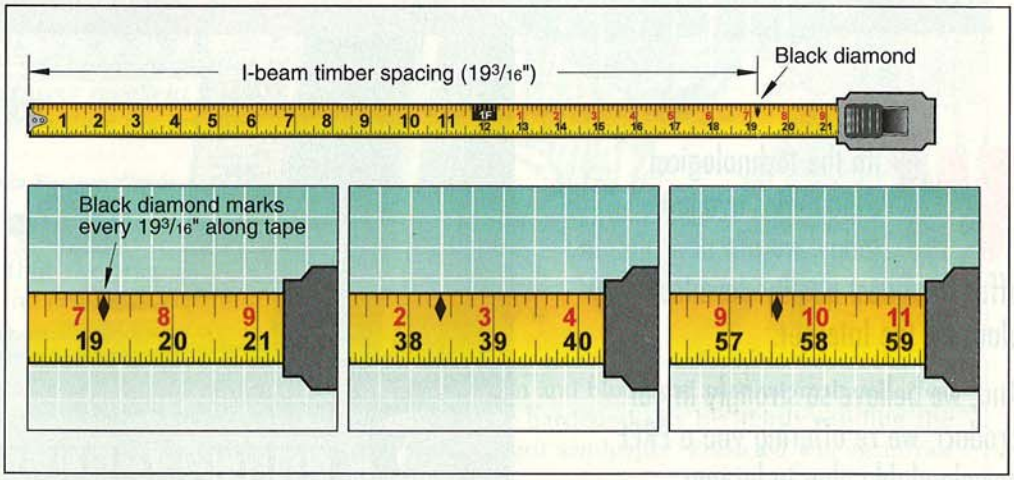
—Joseph Bradfield, Sibley, Iowa

We had our suspicions about these markings, Joe, but went to Stanley Tools for the official word. Here's what they told us.

Several wood-product manufacturers offer I-beam "timbers" as a substitute for solid lumber floor joists. The diamond marks on our tape rule blades are for spacing these engineered floor joists in new construction.

Because these beams are able to support more weight than their dimensional lumber counterpart, they often have different spacing requirements. Span tables for these beams provide ratings for spacings of 12", 16", 19 3/16", and 24". If you multiply these dimensions by 8, 6, 5, and 4, respectively, you'll find each comes to 96", the length of the plywood panels used for sub-flooring.

Those diamond marks are there for builders who want to take advantage of the great strength of engineered I-beams by using fewer floor joists, with no loss of floor support, where codes allow.



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A holey solution

I like to build radio-controlled model aircraft from balsa wood, but I'm having trouble cutting holes in the 1/16"-and-thicker balsa. I've tried many different types of bits at varying speeds to no avail. The wood tears out the back side of the hole. Can you offer some tips on cutting holes in balsa?

—Clarence H. Dollmeyer, Edmund, Okla.

Clarence, we can offer you two tips for drilling clean holes in any wood.

Tip no. 1: Drill a small pilot hole all the way through the board. Then drill part way through with the correct sized bit, flip the board over, and finish drilling from the other direction.

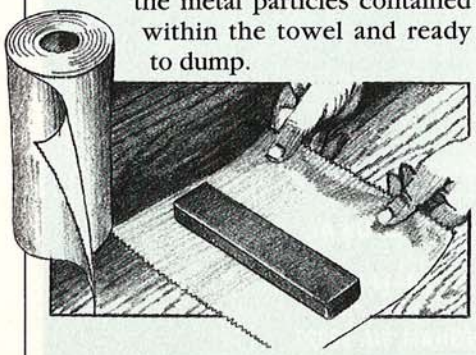
Tip no. 2: With an especially thin board, tightly clamp it between two scrap boards, and drill through the whole sandwich. The support from the scrap boards will keep the balsa from tearing out the front and back.

A super way to keep magnets clean

In my shop I work with both wood and metal. I use magnets to separate metal shavings from the sawdust. When I'm done, though, I have a heck of a time getting the metal particles off the magnet. Is there a better way?

—Don Carter, Sr., Fredericksburg, Va.

Actually Don, you can pick up those metal particles without cluttering up your magnet in the first place. Simply wrap the magnet in a thin paper towel. Then, pick up the metal shavings as usual. Afterward, if you carefully lift one end of the towel up and away from the magnet, you'll have all the metal particles contained within the towel and ready to dump.



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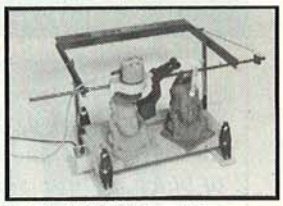
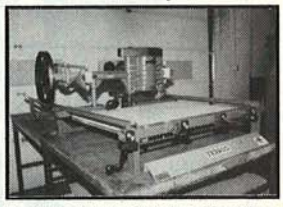


Model T-110 Dupli-Carver

Model CM614 Sign Carver



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Circle No. 75

Continued from page 95

Should spalted sapwood be saved?

Recently, I became the lucky owner of some large slabs of black walnut. Some of it, especially the lighter wood, has dark spots and lines throughout the wood. My friends tell me it's spalted. What makes this transformation in the wood? Is it on its way to decay?

—Chet Moore, St. Helena, Calif.

Wood becomes spalted because of naturally occurring fungi, Chet. This type of wood rot typically appears as black lines in lighter woods. The resulting pattern, such as the one *above*, is often uniquely stunning in its criss-crossing rivers of contrasting colors. Depending on the degree of decay and how you intend to use the wood, it may or may not be suitable for projects.

Generally, you can arrest the decay by kiln drying the lumber. Kiln drying removes the conditions (moisture and heat) causing the decay. However, if the wood has become too "punky" and porous, you have a few options to strengthen it.

One woodworker, Darrell Rhudy of North Carolina, who focuses on turning spalted wood, strengthens the edges of his turnings by soaking the rims with cyanoacrylate glue. You can also "stabilize" the entire piece by having it impregnated with an acrylic resin.

The expensive stabilization process ($10 to $20/lb after treatment) can yield incredible results. One expert in wood stabilizers, Jim Fray of Wild Woods, told us that spalted walnut sapwood can yield some exciting figure when subjected to this stabilizing process, especially when using colored acrylics. Yet, he also cautions that you test a small piece before investing too much to save your sapwood. For more information on stabilizing, contact:

Wood Stabilizing Specialists
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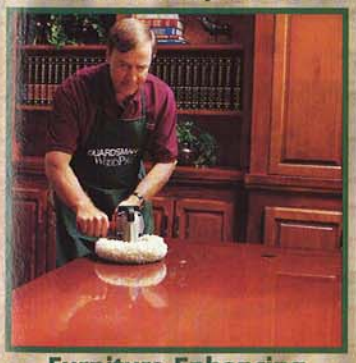
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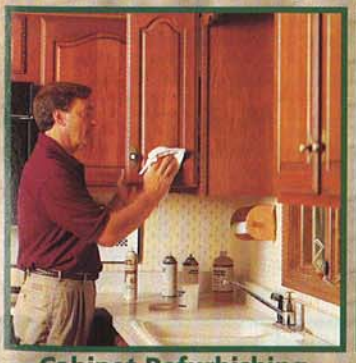
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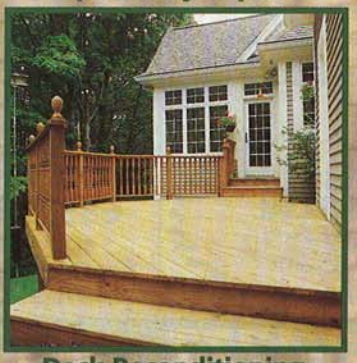
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Continued from page 96

How to make your biscuits rise

I've tried the new polyurethane wood glues and they make me wonder about something. Biscuits expand by drawing moisture from the glue. But polyurethane glues also draw moisture from the wood. Does this mean that the glue will take the moisture from the biscuit and keep it from swelling?

—Kevin Krall, Dewey, Ill.

You peaked our curiosity, Kevin, so we decided to do a test run with a biscuit, some polyurethane glue, and a few pieces of oak. To accurately gauge the effect of the glue on the biscuit only, we applied the glue to the biscuit and not to the surrounding wood. After letting the joint set up, we hit it with a hammer to break it apart. As you can see in the photo *above right*, the biscuit and glue joint remained completely intact. The surrounding wood however, broke off around the biscuit.

We wanted to know why this happened, so we put a call in to Chris Filardi, who is a products representative at Elmers. Chris told us that polyurethane glue draws moisture from both the wood and the air. With this added moisture, the glue swells and fills the gaps in the joint. Because of this drawn moisture, the biscuit will not swell as much as it would have with other wood glues. However, polyurethane wood glue holds to an average of 3,500-3,800 psi. Regular wood glue only holds to 2,500-3,000 psi. It's really a question of having the strength of the joint in the biscuits or in the adhesive.

Chris also offered this tip. If too much poly glue is used, and the joint isn't clamped perfectly, then the glue can actually swell up enough to push the joint apart. He suggests a little practice for finding the right amounts of polyurethane wood glue.

So Kevin, feel free to butter your biscuits with woodworker's or polyurethane glue. Keep in mind, unlike woodworker's glue, poly-glue is waterproof, so it's great for outdoor applications.

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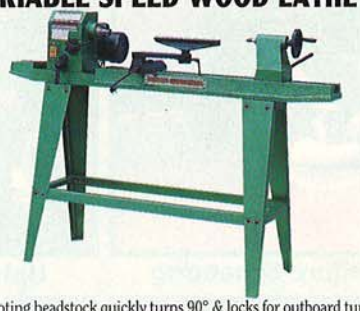

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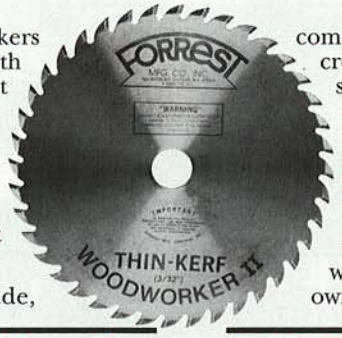

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10" x 80 T	~~$139~~	$125	$111
12" x 80 T	~~$149~~	$134	$119
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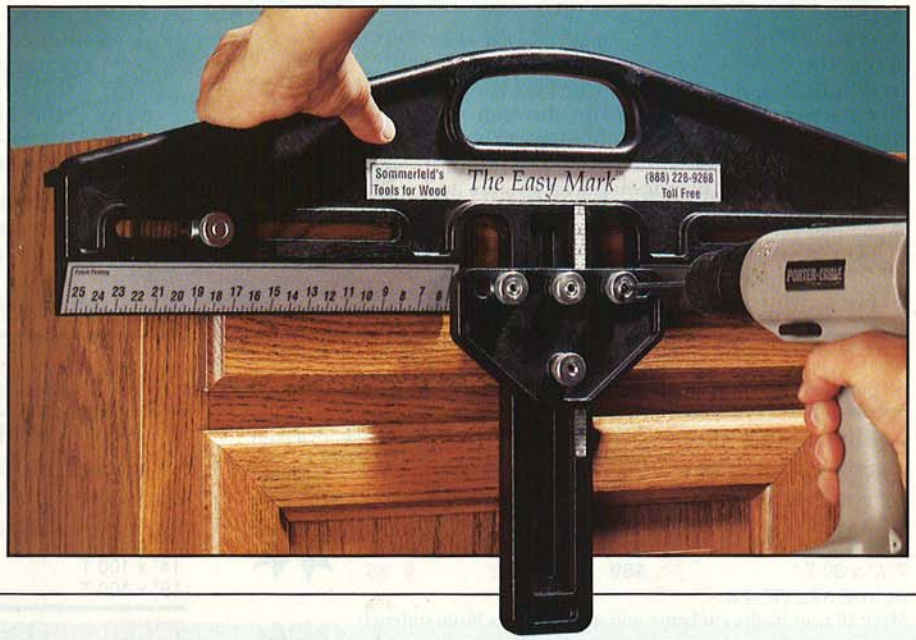
—Tested by Dave Henderson



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With its tilting, swiveling head, I found I could light up the cut line easily when using it on my bandsaw. It was here, though, that I wish the Halogen Work Light came with a magnetic base to switch with the squeeze clamp. That would open up a whole new range of locations where it could be attached.

To my wish list of modifications I'll also add a longer power cord (it's only 12") and perhaps an on-off switch. But those are small minuses compared to the pluses: a comfortable soft-grip handle for hand-held applications (such as checking a fresh finish) and just the right amount of true-to-color light for task work.

—Tested by Dave Henderson

PRODUCT SCORECARD

Regent MCL-35 Halogen Work Light

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Price	$20
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Continued on page 102

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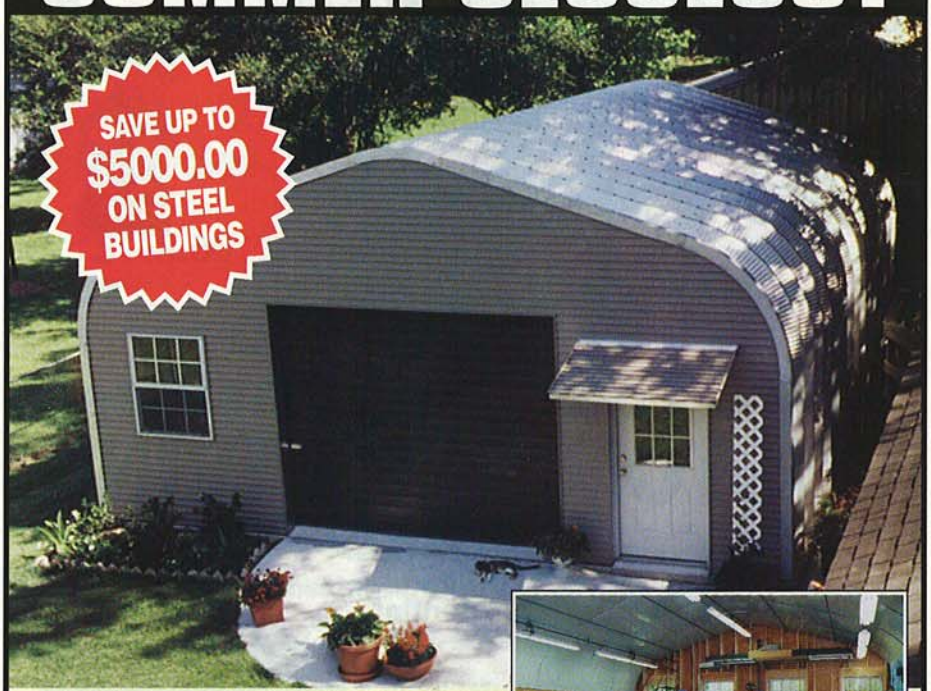

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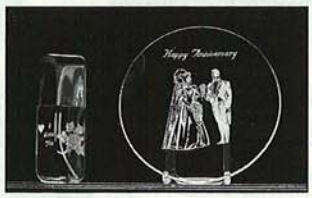

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Continued from page 101

No more stiff bristles with Brush Stuff

You know the story: You were sure you washed every bit of paint out of that brush the last time you used it, but now you reach for it and it's stiffer than a paint stick. If the folks who make Brush Stuff have their way, that's a tale you'll someday tell your grandkids. That's because this brush and roller conditioner prevents paint from bonding to bristles and roller nap, making them easier to clean.

And it couldn't be simpler to use. I just squeezed a dab of Brush Stuff in the palm of my hand (it feels like hand lotion) and massaged it into the bristles. After painting the window trim on my house—a task that really taxes a brush—cleanup was a snap. Even paint that had worked its way up into the ferrule of the brush washed away. Then I worked another dime-sized spot of Brush Stuff into the brush after cleaning to keep it ready for my next project.

Brush Stuff works with any type of brush or roller, and most latex, acrylic, or oil-based paints. And in my tests, it didn't alter the color or quality of the finish.

—Tested by Dave Henderson

1999 WOOD MAGAZINE EDITORS' CHOICE

PRODUCT SCORECARD

Brush Stuff

Performance	★ ★ ★ ★ ★
Price	$6 per 6 oz. tube
Value	★ ★ ★ ★ ★

Available at home centers and paint stores. For more information, call 800/321-3444, or visit The Flood Company at www.floodco.com

This mighty Mouse saves the detail-sanding day

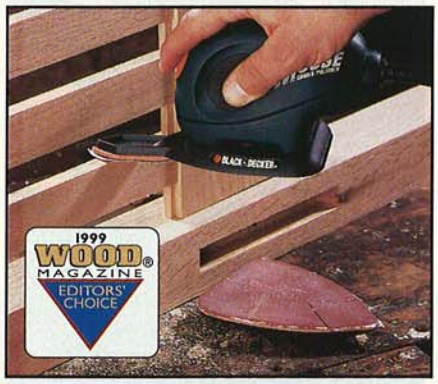
You might find a mouse attached to your computer or skittering along the kitchen floor. And now, the folks at Black and Decker have a mouse you'll gladly invite into your shop. The aptly named Mouse Sander/Polisher looks like a cross between a computer mouse and a clothes iron. And, like the iron, its teardrop-shaped sanding pad smoothes hard-to-get corners, such as those in my kitchen drawers.

On most detail sanders, I wear out the tip before the rest of the abrasive. But each hook-and-loop Mouse abrasive pad has a replaceable diamond-shaped tip. So, when the point gives out, you can remove only the tip and replace it with a new one.

The Mouse takes detail sanding one step further—or maybe I should say deeper—than other detail sanders. By replacing the standard platen with the detail platen (with its 1½"-long extension shown in the photo *below*), I could sand into spots so narrow only the four-legged variety of mouse could have reached them before.

But don't let the cute name fool you: The Mouse gave me a smooth finish with little vibration and good control. And, besides a two-year warranty, you get 23 abrasive pads—including steel wool and nylon—for nearly every sanding or polishing chore.

—Tested by Dave Henderson



PRODUCT SCORECARD

The Mouse Sander/Polisher

Performance	★ ★ ★ ★ ★
Price	$60
Value	★ ★ ★ ★ ★

For your nearest Black and Decker dealer, call 800/762-6672. Or visit www.blackanddecker.com

Continued on page 104

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Circle No. 1

PRODUCTS THAT PERFORM

Continued from page 103

Router jack raises bits and spares tired fingers

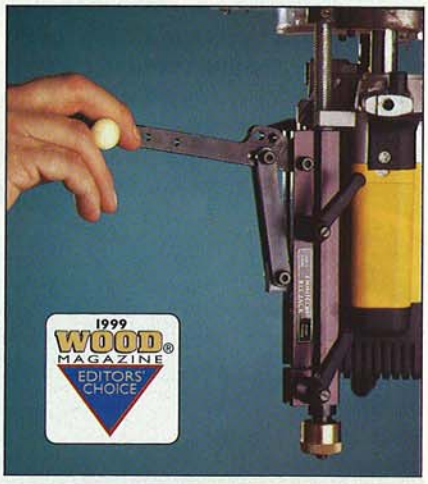
I have always had a devil of a time changing the bit height of my table-mounted plunge router. But, with the Veritas Router Jack attached, I effortlessly raised or lowered bits as much as 1⅝" with a simple lever. No more turning and turning (and *turning*) that hard-to-reach knob to make large height changes.

The jack handle alone gave me extraordinary control, but the micro-adjust knob on the Router Jack adds hair-splitting accuracy. A ball-detent within the mechanism clicks to indicate every depth change of $\frac{3}{1000}$"—about half the thickness of a human hair.

The Router Jack also simplifies progressively deeper cuts, say, when cutting raised panels. I locked in the final depth with the micro-adjust lock, backed the bit down, then raised it a little after each pass until I hit my "stop." For hands-free bit raising, use the included chain linkage to connect the jack handle to a foot pedal.

The Router Jack comes in three sizes to fit most any plunge router with exposed height-adjustment knobs. Know your brand and model number to get the right one for your machine.

—Tested by Bob McFarlin



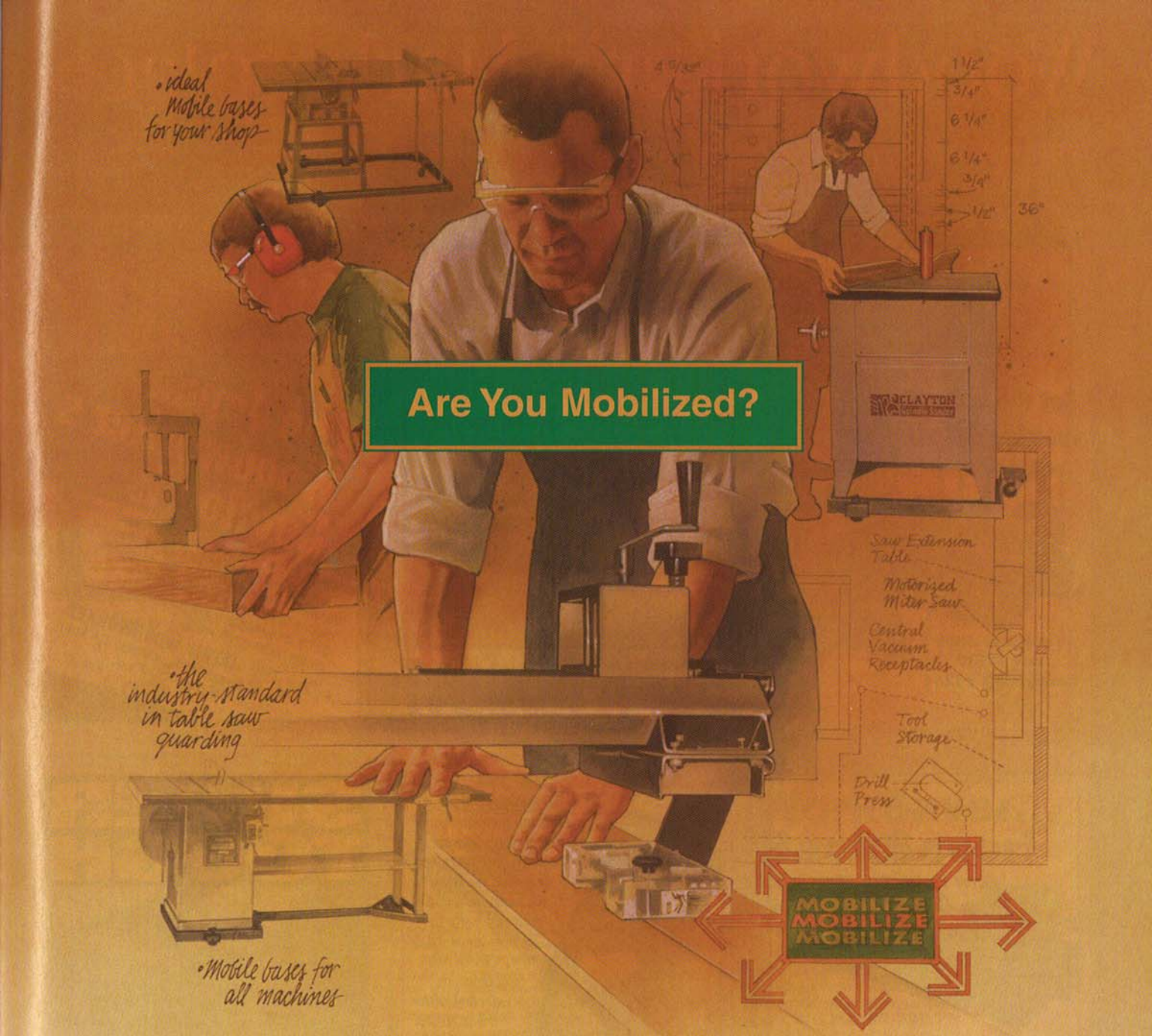
PRODUCT SCORECARD

Veritas Router Jack

Performance	★ ★ ★ ★ ★
Price	$55
Value	★ ★ ★ ★ ★

Available from Lee Valley Tools, 800/871-8158, or on the web at www.leevalley.com.

Continued on page 114



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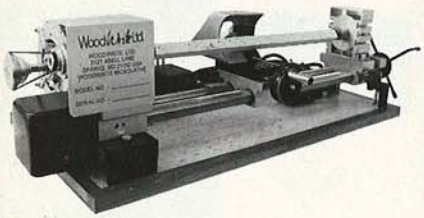

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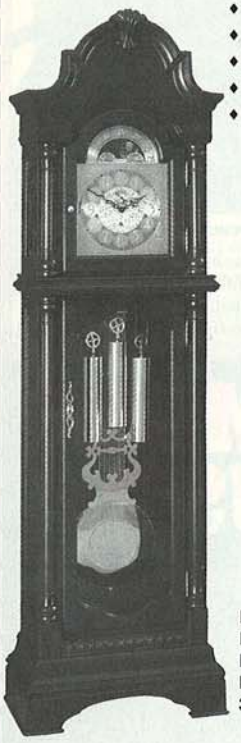

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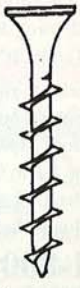

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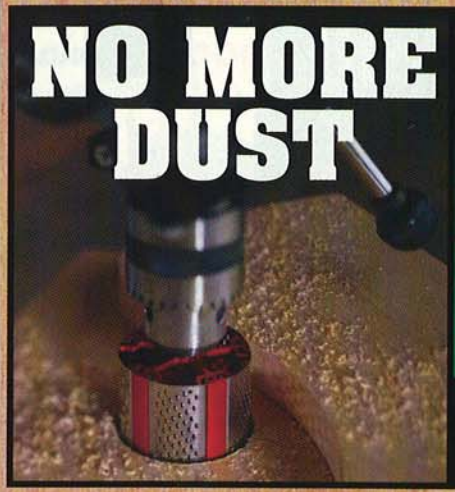

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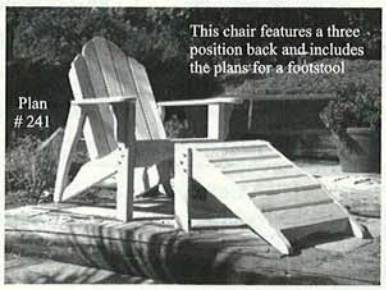

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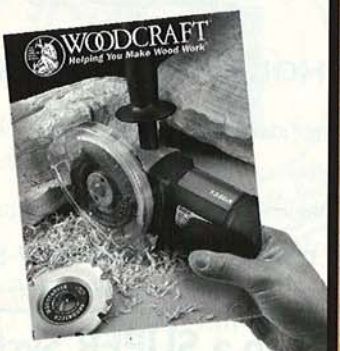

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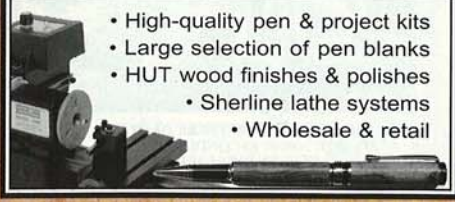

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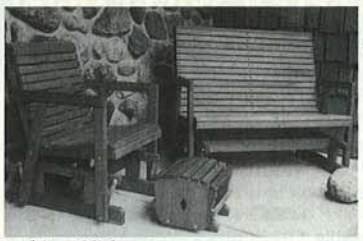

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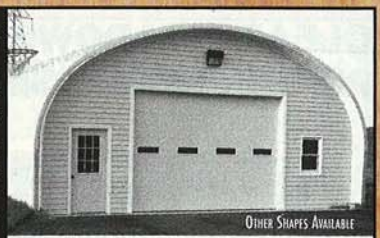

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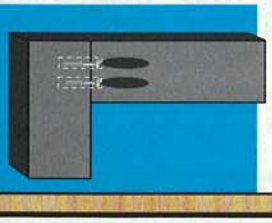

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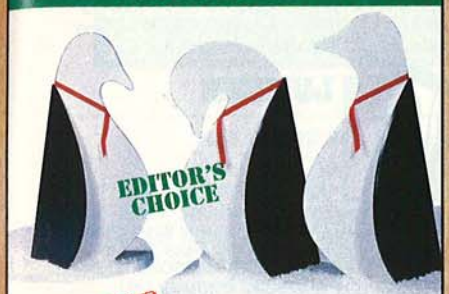

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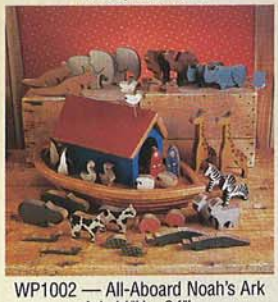
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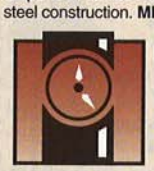

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PRODUCTS THAT PERFORM — SHOP TESTED

Continued from page 104

Sand straight or throw it a curve: this unique sander handles it all

If you took a belt sander and gave it the up-and-down motion of an oscillating spindle sander, you'd have one aggressive sanding machine. Add an interchangeable oscillating spindle to the equation, and you'd have an abrasive tool that meets a wide variety of your sanding needs. That's exactly what you'll find in Ridgid's Oscillating Edge Belt-Spindle Sander.

With this machine in belt-sanding mode, I flattened and contoured edges faster than I could with a normal belt sander. That's because the oscillating motion of the belt constantly feeds fresh grit against the workpiece, which means faster stock removal, less clogging of the belt, and less edge-burning. Remove the belt assembly as shown at *right*, slip a rubber drum and sanding sleeve over the unit's drive shaft, and in less than a minute you have a dynamite oscillating spindle sander for sanding inside curves.

I found it worth the time it takes to switch to the spindle-sanding configuration for such tasks. Although both drums are open for sanding with the belt assembly in place, the smaller idler drum just isn't designed for use in this manner. I tried sanding on the idler—despite the owner's manual warning against it—and was rewarded with a mistracking belt.

The Oscillating Edge Belt-Spindle Sander has some other nice attributes as well, including a strong and smooth 4.6 amp. induction motor, and a 45°-tilting tabletop. It also comes with a 4×24" sanding belt, five sizes of inserts, sanding drums, and sleeves ranging from ½" to 2" in diameter, with on-tool storage for all.

—Tested by Bob McFarlin

PRODUCT SCORECARD

Ridgid Oscillating Edge Belt-Spindle Sander

Performance	★ ★ ★ ★ ★
Price	$240
Value	★ ★ ★ ★ ★

Available at Home Depot stores. For more information call 800/474-3443, or visit Ridgid on the internet at www.ridgidwoodworking.com.

Basswood

The carver's favorite—but there's more to it than chips

Although you'll find five native species of basswood trees in North America, the most widespread is the American basswood (*Tilia americana*). It grows from New Brunswick to North Dakota and south to Missouri and West Virginia.

Today, basswood stock has become the carver's wood of choice. That's because the featureless, fine-grained, whitish wood won't split or chip ahead of the blade.

Even among some Native Americans of centuries ago it had its place as a carving wood. The Iroquois Indians of New York's Adirondack Mountains, for instance, carved masks from basswood, although with a quite-different approach. They shaped them in the sapwood of standing trees, then split them off the trunk to complete the hollowing.

In those long-ago days, Indians of many tribes also made good use of the basswood's inner bark. This material ranks among the toughest of nature's fibers. Stripped from trees in early spring, the bark was soaked in water for weeks to let the softest tissue ret (decay). The remaining strands then were twisted into cord and rope. Thinner bark fibers became sewing thread.

While technology has replaced these fibers with nylon and other materials, basswood stock still retains a place in commerce. It becomes boxes, crates, toys, substrate for veneers, and hidden furniture parts. And if you happen to have a yardstick given away long ago by a local hardware store or lumberyard, you can bet it's made of basswood because the wood takes ink so well.

Illustration: Jim Stevenson

Native Americans stripped the inner bark of basswood in early spring for use as cords, rope, and thread.

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HARBOR FREIGHT TOOLS

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CENTRAL MACHINERY

1" BELT/ 5" DISC SANDER

Remove the belt back plate and sand all types of curves and odd shapes. With the back plate in place, you can apply pressure for faster stock removal.

- Belt length: 30", 3450 FPM belt speed
- Motor: 1/3 HP, 2.4 amp, 60 Hz, 110V, 3450 RPM • Dust collection • Shipping wt.: 19 lbs.
- Table: 5" x 5", tilts to 45°

ITEM 34951-1SEA ~~$59.99~~ $49.99

SANDING BELT CLEANER

- Increase the life of your sanding belts and discs up to 500%
- 8-1/2" x 1-1/2" x 1-1/2"

ITEM 30766-0SEA $3.99

COMPARE & SAVE!

POCKET-SIZE LASER LEVEL KIT

Small enough to stash in your toolbox, this powerful laser helps you make quick and easy alignments. The laser projects a high-visibility dot up to 500 ft. away. Removable lens lets you project a level line the full width of your project. Equipped with a horizontal bubble vial for accurate readings. Pocket tripod features legs that adjust from 4" to 6-1/2".

~~$59.99~~ $39.99

ITEM 38245-3SEA

CHICAGO Electric Power Tools

3-1/4" PLANER

- Front base V-groove to help guide in chamfering • 2 blade cutter
- Depth adjustment knob
- Includes rabbeting guide plate/fence, sharpening holder, blade setting jig, replacement brushes, replacement belt
- D-handle with lock-on button
- 110V, 5 amps, 17,000 RPM
- 34,000 cuts per minute
- 1/10" maximum depth of cut; 3-1/4" planing width
- Tool weight: 6-1/4 lbs.

ITEM 32222-3SEA ~~$53.99~~ $39.99

2 PC. REPLACEMENT BLADES

ITEM 33262-0SEA $9.99

CENTRAL MACHINERY

12" DIRECT DRIVE BENCH TOP DISC SANDER

Table tilts to 45°; 2" dust collection outlet; fan-cooled brushless motor; miter gauge

- 1 HP, 120V, 10.0 amps
- Wheel diameter: 12"
- Includes 60 grit, 12" sanding pad
- No load speed: 1793 RPM
- Base: 13" x 10"
- Shipping weight: 92 lbs.

~~$129.99~~ $89.99

ITEM 37297-3SEA

12" SANDING DISCS

Come in packs of 2.

GRIT	ITEM	PRICE
60	37958-1SEA	$6.99
120	37959-1SEA	$6.99
240	37960-1SEA	$6.99

OLYMPIA TOOLS

E-Z READ ™ TAPE MEASURE

Graduated in 32nds, tapes have 1/8" calibrations clearly marked, inch and foot increments in red and stud markings in red.

THE MOST USER FRIENDLY TAPE MEASURE YOU WILL EVER FIND!

3/4" x 16 FT. ITEM 38261-4SEA ~~$4.99~~ $2.99

1" x 25 FT. ITEM 37570-0SEA $5.99

1" x 33 FT. ITEM 38262-0SEA $9.99

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CHICAGO Electric Power Tools

18 VOLT CORDLESS, 5-3/8" CIRCULAR SAW KIT

Cut up to 85 ft. of plywood on a single charge. Kit includes: 1 hour quick charger, 18 volt battery, saw and hex key.

2400 RPM; 1.3 amps; 10mm arbor; 50° bevel capacity; maximum depth of cut @ 90°: 1-1/2" and @ 45°: 1-1/4"; weighs 7-1/2 lbs. Blade and rip fence sold separately

~~$109.99~~ $69.99

ITEM 37412-7SEA

18 VOLT REPLACEMENT BATTERY

ITEM 37145-4SEA $37.99

5-3/8" TUNGSTEN CARBIDE TIP BLADE

Teeth: 24, C2 carbide steel, 10mm arbor, max. RPM: 7000

ITEM 37413-2SEA $6.99

RIP FENCE

ITEM 37449-1SEA $3.99

CHICAGO Electric Power Tools

1/2 OFF

HEAVY DUTY 4-1/2" DISC GRINDER

- 5/8"-11 spindle with 7/8" arbor adapter
- Motor: 3/4 HP, 115V, 5.18 amps
- Spindle lock • 11-7/8" long
- High powered 10,000 RPM

~~$39.99~~ $19.99

ITEM 31135-6SEA

4-1/2" x 1/4" GRINDING WHEELS • 24 grit, 7/8" arbor

FOR	ITEM	10 PACK
Metal	06674-0SEA	$8.99
Masonry	07422-2SEA	$8.99

CENTRAL PNEUMATIC®

MEETS ENVIRONMENTAL REGULATIONS

HVLP GRAVITY FEED SPRAY GUN

High volume low pressure technology applies with less overspray. Stainless steel needle and tip allow use with water-based material. Includes air regulator.

- PSI: 15-50 • CFM: 2.8 to 8
- Cup size: 20 oz • Nozzle size: 1.4mm.
- Material output: 20 to 50cc/minute
- Air inlet: 1/4" NPT
- Tool weight: 2 lbs.

~~$59.99~~ $39.99

ITEM 38308-2SEA

GRAVITY FEED PAINT CUPS

SIZE	ITEM	PRICE
20 oz.	38517-1SEA	$7.99
33 oz.	38518-1SEA	$9.99

CENTRAL MACHINERY

10", 2 HP BENCH TABLE SAW

Die cast aluminum table 26" x 16", has adjustable 17-7/8" x 2" rip fence and inch/metric scale for precise cutting. Blade adjustments control angle and depth of cut. Anti-kickback fingers and see-through blade guard for safety. Maximum depth of cut at 90°: 3-1/8"; at 45°: 2-1/2"; Blade capacity: 10" with 5/8" arbor; Miter gauge adjusts 0° - 60° left and right; Motor: 2 HP, 115V, 60 Hz, 10 amp, 4500 RPM; Blade and stand sold separately; Shipping weight: 36 lbs.

~~$119.99~~ $79.99

ITEM 38533-1SEA

10" 40 TOOTH CARBIDE TIP SAW BLADE • 5/8" arbor

ITEM 00529-4SEA $9.99

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CENTRAL MACHINERY

DRY TABLE, NO OILER NEEDED

HEAVY DUTY 16 SPEED FLOOR DRILL PRESS

Cast iron table is accurately gauged, tilts to 45° left or right. Chuck capacity: 7/64" to 5/8"; does not include lamp; Spindle taper: MT2; Swing: 13-1/2"; Column diameter: 2-57/64"; Table diameter: 11-1/2"; RPM: 190-3600

~~$199.99~~ $179.99

ITEM 38144-1SEA

29 PC. TIN BIT SET

- Sizes: 1/16" through 1/2" by 64ths
- Steel index box;

ITEM 05889-1SEA $26.99

CENTRAL MACHINERY

29" UNIVERSAL TOOL STAND

Heavy duty all metal stand fits Central Machinery 13", 15", and 16" scroll saws, 10" bench table saw, and bench drill presses, as well as other brands. Also use for miter saws and jointer/planers. (Not shown)

ITEM 07769-1SEA ~~$39.99~~ $29.99

34" HEAVY DUTY TOOL STAND

Adjusts to fit all Central Machinery bandsaws, bench top drill presses, and electronic scroll saws. Fits many other tools. 34" high. (Shown above)

ITEM 32971-1SEA ~~$49.99~~ $39.99

CHICAGO Electric Power Tools

18 VOLT CORDLESS VSR DRILL/DRIVER

WITH 3/8" KEYLESS CHUCK

More run time than 14V cordless drills. Balanced T-handle design keeps the drill steady. 6 pc. screwdriver bit set, 6 pc. drill bit set; Includes charger, 18V battery, and carrying case; Speed range: 0-900 RPM; 3/8" Jacobs® keyless chuck; Variable speed reversible; 6 torque clutch settings; Heavy duty Johnson's motor.

ITEM 37144-4SEA ~~$72.99~~ $59.99

18V REPLACEMENT BATTERY

ITEM 37145-4SEA $37.99

CENTRAL MACHINERY

LIMITED QUANTITIES

10" PLANER

- 2 HP, 110V, 1 phase, 11 amp, 8000 RPM
- 5-1/8" working distance
- 10-1/8" x 9-1/8" feed table
- 19" x 16-5/8" x 16" overall dimensions
- 10-1/8" blade size
- 2-blade cutter head
- 61 lbs. shipping weight
- Stand sold separately

~~$239.99~~ $199.99

ITEM 06935-4SEA

PLANER STAND

- Shipping weight: 20 lbs.
- 20" x 10" x 27"

ITEM 32969-3SEA $29.99

REPLACEMENT BLADE SETS (2 PCS.)

STEEL TYPE	ITEM	PRICE
Spring	32970-0SEA	$19.99
High speed	36068-1SEA	$29.99

DELTA®

LIMITED QUANTITIES

Delta 40-560R

16" 2-SPEED SCROLL SAW

- 1/10 HP, single phase, 115V, 1.2/.7 amp induction motor
- 850 and 1725 SPM
- Capacities: 16" throat, 2" thick, 7/8" stroke
- Accepts 5" straight end blades
- Table tilts 45° left for bevel cuts
- Predrilled base holes and rubber pads for bench mounting
- 11-3/4" diameter table
- Cast iron table and frame
- Factory reconditioned, factory perfect

~~$109.99~~ $99.99

ITEM 51840-2SEA

GREAT FOR PLUMBERS AND ELECTRICIANS

10 PC. LARGE HOLE SAW SET

Bores through 1" thick drywall, wood and plaster with ease. Includes cutting cup sizes 2-1/2", 3", 3-1/2", 4", and 5", plus 3/8" mandrell, drive plate, 6.1mm drill bit, hex wrench, and blow mold case.

ITEM 36222-6SEA ~~$11.99~~ $5.99

12 PC. HOLE SAW SET

Cut smooth, clean, accurate holes up to 1" thick! Set includes 8 tool steel cups sized 3/4", 1", 1-1/8", 1-1/4", 1-1/2", 1-3/4", 2", and 2-1/2" plus 1/4" and 3/8" mandrels, 1/4" bit (2" long), hex wrench and blow mold case.

~~$11.99~~ $5.99

ITEM 38425-1SEA

CENTRAL PNEUMATIC®

NEW

2 HP, 4 GALLON PANCAKE COMPRESSOR

Excellent for contractors and roofers. 115V, 60 Hz; 3450 RPM; 5.2 SCFM @ 40 PSI; 4.2 SCFM @ 90 PSI; 51 lbs.

ITEM 38898-0SEA $129.99

3/8" x 50 FT. HEAVY DUTY RUBBER AIR HOSE

Handles up to 200 PSI working pressure. Solid brass ferrules and 1/4" NPT male fittings. 3/8" I.D. hose.

ITEM 02167-6SEA $19.99

DELTA®

Delta 17-960

LIMITED QUANTITIES

OSCILLATING SPINDLE SANDER ATTACHMENT

This spindle attachment turns almost any drill press into an oscillating spindle sander. Accepts up to 3" sanding drums. Includes table with dust outlet, 1" and 2" steel inserts, 2 drive belts, gear box, belt guard, mounting bracket and hardware.

- 40 SPM on 2" diameter drill chuck running at 2000 RPM
- 3/4" stroke
- 8-1/2" x 8-1/2" table
- 2-1/4" diameter dust outlet

ITEM 53508-2SEA $49.99

44 PC. SANDING DRUM/ SLEEVE ASSORTMENT

ITEM 53509-0SEA $19.99

24 PC. SANDING SLEEVE ASSORTMENT

ITEM 53510-0SEA $14.99

Pittsburgh

Pittsburgh LIFETIME WARRANTY

2 PC. 3/4" HEAVY DUTY PIPE CLAMP

Constructed from heat-treated cast iron. Add to a 3/4" threaded pipe and slide the spring loaded end on. Pipe not included. Handle screw operating range: 2-1/8"; 1-1/2" throat depth

ITEM 31255-1SEA ~~$6.99~~ $3.99

2 PC. DEEP THROAT 3/4" PIPE CLAMP

Pipe not included.

Add these fixtures to a 3/4" pipe and get a clamp with 7" throat capacity. 7" throat depth; 1-7/8" x 2-3/16" pressure feet; Steel lead screw with cast iron crank

ITEM 38299-3SEA ~~$9.99~~ $6.99

RASK

RADIAL ARM SAW KIT

The performance of a radial saw at a fraction of the cost. Award-winning patented design features easy setup with most 7-1/4" and 7-1/2" circular saws. Makes fast accurate bevels, rips, miters, and crosscuts. Ruggedly built and completely portable.

- Saw and table wood not included

Maximum miter & bevel: 45°; Crosscut: 12-3/4"; Length: 24"; Rip capacity: 15-3/4"; Height: 22"; Weight: 23 lbs.

ITEM 33576-1SEA ~~$59.99~~ $49.99

CHICAGO Electric Power Tools

TRIM ROUTER

Now you can tackle those jobs that were too fine or exacting for a standard router. This compact router weighs only 4 lbs. for easy operation. Includes a straight and adjusting conductor to assist in trimming and engraving in both straight and circular patterns.

- 1/4" collet
- 8-1/2" overall length
- 110V, 3-1/4 maximum amp draw
- 30,000 RPM no load speed
- 4 lbs. tool weight

ITEM 33833-6SEA ~~$45.99~~ $36.99

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DELTA TOOLS

Model	Description	List	Sale
31-750	NEW Bench Random Orbit Sander		Sale 199
28-150	NEW 9" Bench Band Saw	Sale	155
50-860	850 CFM Air Cleaner	Sale	239
31-695	6" Belt/9" Disc Sander	441	299
23-710	Sharpening Center	217	149
31-460	4" Belt/Disc Sander	198	119
40-560	16" 2 speed Scroll Saw	230	129
40-540	16" var/spd Scroll Saw	249	159
11-990	12" Bench Drill Press	255	184
11-090	32" Radial Bench Drill Press	405	279
43-505	1/2" Bench Router/Shaper	398	299
22-540	12" Bench Top Planer	Sale	259
22-560	12-1/2" Planer w/ extra knives		329
36-865	Versa Feeder Stock Feeder		249
36-220	10" Compound Mitre Saw	.294	199
37-070	6" v/spd Bench Jointer	351	265
14-650	Hollow Chisel Mortiser	380	249
17-900	16-1/2" Floor Drill Press	490	329
17-924	NEW Mortise Chisel Kit	Sale	65
36-285	8-1/4" Builders Saw w/ stand	Sale	275
34-555	Sliding Table	487	315
36-250	10" Slide Compound Saw	.825	455
31-780	Oscillating Spindle Sander	253	194
46-700	12" Wood Lathe	575	479
40-650	Q3 18" Scroll Saw	Sale	389
36-905	30" Unifence	346	259
36-906	50" Unifence	444	319
36-444	10" Contractors Table Saw	Sale	579
37-195	NEW 6" Professional Jointer	625	539
33-830	NEW 10" Radial Arm Saw	.851	729

Single Stage Dust Collectors

50-850	1-1/2 HP, 1200 CFM	Sale	285
50-851	2 HP, 1500 CFM	Sale	489

The following tools have a $50.00 rebate! Price shown is before rebate. Rebates valid thru 6/30/99. Quantities are limited.

36-455	10" Contractors Table Saw w/ 30" unifence, cast iron wing, 34-914 table board, & carbide blade	Sale	849
22-675	DC380 15" Planer	Sale	1175
28-275	14" Band Saw 3/4 HP	Sale	595
28-280	14" Band Saw 1 HP motor with enclosed stand	Sale	739
28-270	14" Band Saw 1 HP w/ 50-274 mobile base, 28-855 rip fence, & 28-266 cool blocks	Sale	849
31-280	Sanding Center w/ stand	Sale	789
37-190	6" Deluxe Jointer	603	445

MILWAUKEE TOOLS

6527-6	Sawzall with case	343	169
6537-22	6527 w/quic k lok b lade c hang e	224	179
0407-22	12V Drill w/kyls c huck & 2 batt	380	175
0224-1	3/8" Drill 4.5 amp magnum	236	134
0234-6	1/2" Drill 4.5A mag 0-850 rpm	255	134
0235-6	1/2" Drill w/keyless chuck	.255	139
0244-1	1/2" Drill 4.5A mag 0-600 rpm	255	139
0222-1	3/8" Drill 3.5 amp 0-1000 rpm	213	125
0228-6	3/8" Drill 3.5 amp 0-1000 rpm	207	124
0375-6	3/8" close quarter Drill	.255	148
0379-1	1/2" close quarter Drill	.288	168
6546-6	Screwdriver 200 & 400 rpm	150	89
6547-6	6546-6 w/bits,1/4" chuck & cs	185	109
5399	1/2" D-hdle Hammer Drill Kit	356	219
5397-6	3.8" v/ spd Hammer Drill Kit	275	145
5371-6	1/2" v/ spd Hammer Drill Kit	360	194
3107-6	1/2" v/spd right angle Drill Kit	411	239
6142	4-1/2" Grinder w/cse & acc.	224	132
6490-6	10" Mitre Saw	496	269
6491	6490 w/ carbide blade & bag	594	345
6494-6	10" Compound Mitre Saw	.585	319
6266-6	Top Handle Jig Saw	315	159
6496-6	10" Slide Compound Saw	1050	569

FREUD CARBIDE TIPPED SAW BLADES
5/8" Bore - Industrial Grade

Item	Description	Teeth	List	Sale
LU72M010	Gen Pur. A.T.B.	10*40	69	42
LU82M010	Cut-off 10"	60	93	32
LU84M011	Comb 10"	50	78	45
LU85R010	Super Cut-off	10" 80	115	68
LM72M010	Ripping 10"	24	69	39
LU73M010	Cut off 10"	60	84	49
LU87R010	Thin Kerf 10"	24	72	48
LU88R010	Thin Kerf 10"	60	88	49
LU98R010	Ultimate 10"	80	128	68
LU91M010	Compnd Mitre 10"	60	88	54
F410	Quiet Blade 10"	40	95	54
SD308	8" Dado - Carbide		230	119
SD508	8" carbide w/case & shims		344	172
FB100	16 piece Forstner Bit Set		338	194
94-100	5 pc. Router Bit Door System		320	169
FT2000E	Plunge Router		Sale	185

HITACHI TOOLS

C8FB2	8-1/2" Slide Compound Sa w	1169	449
C10FS	10" Slide Compound Saw	1627	579
C15FB	15" Mitre Saw	1346	645
NV45AB	Coil Roofing Nailer	935	379
NT32AE	NEW Pinner 5/8" - 1-1/4"	Sale	85
NT50AE	NEW Pinner 3/4" - 2"	Sale	119

MAKITA TOOLS

Model	Description	List	Sale
5090DW	3-3/8" Saw Kit 9.6 volt	280	139
DA391D	3/8 angle Drill 9.6V	166	114
DA391DW	3/8" angle Drill Kit 9.6V	341	175
6095DWE	9.6 volt Drill Kit w/2 batt	Sale	125
6095DWLE2	6095DWE w/flashlight	Sale	139
632007-4	9.6 volt Battery	47	30
632002-4	7.2 volt Battery	39	28

NEW 18 VOLT MAKITA TOOLS

6343DWAE	1/2" Drill Kit	Sale	255
5620DWA	6-1/2" Circular Saw Kit	.Sale	259
DK1016	1/2" Drill & 6-1/2" Saw combo kit	Sale	389

CORDLESS DRILLS WITH 2.0 AMP HIGH CAPACITY BATTERIES

6213DWAE	12V 3/8" Drill Kit	325	169
6233DWAE	14.4V 3/8" Drill Kit	358	205

9900B	3"x21" Belt Sander w/bag	347	165
9924DB	3"x24" Belt Sander w/bag	360	175
N1900B	3-1/4" Planer with case	263	142
1912B	4-3/8" Planer	352	205
N9514B	4" Disc Grinder 4.6 amp	.118	65
DA3000R	3/8" Angle Drill	355	185
2708W	8-1/4" Table Saw	637	295
6405	3/8" Drill Rev. 0-2100 rpm	115	65
6013BR	1/2" Drill Rev. 6 amp	270	149
9401	4" x 24" Belt Sander w/bag	458	219
5007NBK	7-1/4" Circ Saw w/ case	250	125
LS1011	10" Slide Compound Saw	995	429
LS1211	12" Slide Compound Saw	1620	695
3901	Plate Joiner Kit	376	159
3612C	3 HP Plunge Router	492	265
LS1040	10" Compound Miter Saw	460	259
LS1013	10" Dual Compound Slide Miter Saw	1088	599
BO5010	5" Random Orbit Sander	142	69
LS1220	12" Compound Miter Saw		379
9227C	7/9" Polisher	350	195
SJ401	16" Bench Scroll Saw	300	175
2702	8-1/4" Table Saw	Sale	299
2703	10" Table Saw	Sale	319

SENCO AIR NAILERS

SFN1+	Finishing Nailer 1 - 2" w/ cs	448	299
SNS45	NEW Stapler 7/16" crown, 1" - 2"	540	365
SLP20	Pinner w/cs 5/8 -1-5/8"	422	199
SKS	Stapler 5/8 - 1-1/2"	390	279
SN70	Framing -Clip Hd 2 - 3-1/2"	725	449
SN65	Framing -Full Hd 2 - 3-1/2"	709	369
SN600	NEW Framing 2 - 3-1/2"	.699	369
SFN40	Finish Nailer 1-1/4 - 2-1/2	.569	359

NEW Accuset Nailers by SENCO

A100LS	Finish Stapler 1/2" - 1"	180	109
A150LS	Finish Stapler 1/2" - 1-1/2"	220	139
A125BN	Brad Nailer 5/8" - 1-1/4"	.160	99
A200BN	Brad Nailer 5/8" - 2"	215	139

BOSTITCH AIR NAILERS

Model	Description	List	Sale
N80S-1	Stick Nailer	Sale	325
RN45	Coil Roof Nailer 3/4 - 1-3/4	845	359
N60FN-2K	Finishing Nailer w/ case	557	269
BT35-2K	Brad Tacker 5/8" - 1-3/8" with case, oil, & brads	279	125
MIIIFS	Flooring Stapler 15 gauge	902	539
S32SX-1K	Finish Stapler-1/2" - 1-3/8" with case & oil	269	139

JORGENSEN ADJUSTABLE HANDSCREWS

Item#	Jaw Length	Opening Capacity	List	Sale	Box of 6
#0	8"	4-1/2"	20.35	12.50	69.95
#1	10"	6"	23.30	13.50	73.95
#2	12"	8-1/2"	26.75	15.75	88.95
#3	14"	10"	33.85	19.35	109.95

PONY CLAMP FIXTURES

Model	Description	List	Sale	Lots of 12
50	3/4" Black Pipe	15.45	8.50	94.00
52	1/2" Black Pipe	12.65	6.95	79.00

PANASONIC CORDLESS

EY6100FQKW	12V 3/8" Drill kit w/ 2 batteries, 15 min. charger, & case	379	179
EY6230FQKW	NEW 15.6V Drill Kit with 2 Ironman batteries, 30 minute charger & case	425	205
EY3503FQWKW	5-3/8" 12V Wood Cutting Circular Saw Kit	500	259
EYC001	EY6100FQKW drill, EY3503FQW saw, 2 batteries, 15 minute charger, and case	Sale	299

BIESEMEYER FENCES

B-50	50" Commer. Saw	443	325
T-SQUARE 52	52" Homeshop	360	275
T-SQUARE 40	40" Homeshop	335	255
T-SQUARE 28	28" Homeshop	325	245

AIRY AIR NAILERS

Model	Description	List	Sale
0241SK	Brad Nailer 3/8" - 1-9/16"	180	98
0626SK	1/4" Crown Stapler 3/8" - 1"	*194	89

Above nailers come w/case, fasteners, oil & wrenches

0241/0626
0241 Brad Nailer, 0626 Stapler, case, fasteners, oil, & wrenches
Super Sale 129.95

STABILA LEVELS

25010	10" die cast Torpedo Level	Sale	19.95
24640	24" Level w/ hand holes	62.20	47
24670	48" Level w/ hand holes	79.70	59

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DEWALT TOOLS

Model	Description	List	Sale
DW124K	1/2" right angle Drill	590	329
DW321K	Top Handle Jigsaw Kit	300	164
DW364	7-1/4" Circ. Saw w/brake	294	155
DW610	1-1/2 HP 2 handle Router	266	149
DW411K	1/4 sheet Palm Sander w/ cse	88	58
DW682K	Biscuit Joiner with case	448	169
DW705	12" Compound Mitre Saw	734	359
DW621	2 HP Plunge Router	400	199
DW675K	3-1/8" Planer with case	292	164
DW431	3 x 21 v/spd Belt Sander	338	188
DW421	5" Palm Ran. Orb Sander	.144	74
DW423	Palmgrip Random Orbit Sander - variable speed	170	89

DW421 & DW423 come with Free DW4317 case !

DW272	Drywall Gun, 0-4000, 6.3 amp	16095	
DW276	Drywall Gun, 0-2500, 6.5 amp	16095	

DEWALT CORDLESS DRILLS

DW972K-2	3/8"variable speed w/ two 12V XR batteries	362	184
DW991K-2	3/8"variable speed w/ two 14.4V XR batteries	415	209

Above drill kits come w/ charger & steel case !

DW991KS-2	DW991K drill, DW935 trim saw, 2 XR batteries & case	Sale	345

DEWALT 18 VOLT CORDLESS TOOLS

DW933K	NEW Jigsaw Kit	468	269
DW938K	Recipro Saw Kit	520	269
DW995K-2	1/2" Drill Kit w/ 2 batt.	Sale	259
DW997K	1/2" Drill/Hammer Drill Kit	454	249
DW936K	5-3/8" Saw Kit	458	249
DW995KS-2	DW995K Drill, DW936 Saw and case	Sale	385
DW995KC-2	DW995K 18V drill kit, DW938 18V recipro saw, & case		395

DEWALT BENCH TOP TOOLS

DW708	12" Slide Mitre Saw	Sale	649
DW788	20" Scroll Saw	Sale	469
DW733	12" Planer w/ extra blades	Sale	399
DW744	10" Portable Table Saw	Sale	499
DW756	6" Bench Grinder	164	75
DW758	8" Bench Grinder	184	115

DAVID WHITE INSTRUMENTS

Model	Description	List	Sale
LP6-20A	Sight Level package-20x	329	239
LP6-20XLA	LP6-20A with 9056 tripod and 7620 rod	409	269
LT8-300	Level Transit - 26x	739	539
LT8-300P	above Level with optical plum	869	629
LT6-900	Level Transit - 20x	419	299
LTP6-900	Above Level with tripod & rod	615	395
ALT6-900	Automatic Level - Transit - 18x	666	479
ALTP6-900	above Level with tripod & rod	799	549
AL8-22S	Automatic Level - 22x	583	279
ALP8-22	Above level with tripod & rod	Sale	349
AL8-26S	Automatic Level - 26x	854	325
ALP8-26	Above level with tripod & rod	Sale	389

BOSCH

Model	Description	List	Sale
1587VS	Top Handle *CLIC*Jig Saw	292	139
1587AVSC	1587VS Saw Kit with case and *New* Progressor blades	Sale	149
1584VS	Barrel*CLIC*Jig Saw	288	149
	Bosch Metal Case for above Jig Saws		24
	Bosch 30 blade assortment for Jig Saws		29

1584VS or 1587VS
with steel case and 30 Bosch blades
Sale 175

1295DH	5" Random Orb Palm Sndr	145	89
1274DVS	3"x21" v/spd Belt Sander	301	175
1278VSK	1-1/2"x12" Belt Sander	218	129
1275DVS	3"x24" v/s Belt Sndr	379	219
1276DVS	4"x24" v/s Belt Sndr	408	229
1194VSRK	1/2" v/ spd Drill w/ case	303	159
1613EVS	2HP v/s Plunge Router	369	199
1634VSK	Recip Saw 10.5 amp	335	185
3315K	12V T-handle Drill Kit	345	159
3615K	14.4V Drill Kit	354	174
3107DVS	5" Random Orbit Sander	165	98
3107DVSK	3107DVS with case	195	118
3725DVS	5" Random Orbit Sander	256	145
3727DVS	6" Random Orbit Sander	266	149
3915	10" Slide Compound Saw	1050	479
3912	NEW 12" Cmpnd Mitre Sa w	.638	299
11224VSR	7/8" SDS Rotary Drill	404	229
1703AEVS	5" Grinder - 8.5 amp	245	145
1347AK	4-1/2" Grinder with case	.159	92
1638K	Drywall Cut-out Unit	165	105
1617	1-3/4 HP Router - 2 handle	Sale	159
1617EVS	2 HP Router w/ variable speed - 2 handle	Sale	189
1618	1-3/4 HP Router - "D" handle	Sale	179
3850	NEW 18V cordless Drill Kit with 2 batteries	Super Sale	269

Circle No. 92

JDS AIRTECH AIR CLEANERS

Model	Description	List	Sale
750	12"x24"x28" 1/4 hp 200 CFM - 750 CFM	Sale	249
8-12	20"x24"x44" 1/3 hp 800 & 1200 CFM	Sale	479

RYOBI SPECIALS

RE600	3 HP Plunge Router v/spd	500	235
BE321	3" x 21" v/spd Belt Sander	310	139

Above sander comes with sanding frame

WDS1600	16" x 32" Drum Sander	.980	569

Above sander comes with stand

JM80K	Plate Jointer with case	.218	99

JET TOOLS

JJ60S	6" Jointer - open stand	Sale	429
JJ6CSX	6" Jointer - closed stand	Sale	499
JJ8CS	8" Jointer - closed stand	Sale	1189
JWP124P	12" Benchtop Planer	.Sale	299
JWBS14OS	14" Band Saw 3/4 HP - open stand	Sale	479
JWBS14CS	14" Band Saw 1 HP - closed stand	Sale	545
JWTS10JF	10" Contractor Table Saw with 30" Jet fence 1-1/2 HP	Sale	549
JWTS10CWPF	10" Contractor Table Saw with 30" Exacta fence 1-1/2 HP	Sale	769
JTAS10X501	10" Tilting Arbor 3 HP Table Saw with 50" Exacta fence	Sale	1399
JDP17MF	16-1/2" Drill Press 3/4 HP - 16 speed	Sale	449
DC-650	Dust Collector, 1 HP, 650 CFM	319	219

PORTER CABLE

9444	Profile Sander Kit	220	99
9444VS	Var/spd Profile Sander Kit	.207	119
690	1-1/2 HP Router 8 amp	278	149
6931	Plunge Router Base	139	85
693PK	690 and 6931 plus case	Sale	199
9690	690 Router with case	Sale	159
691	1-1/2 HP Router D-handle	303	168
693	1-1/2 HP Plunge Router Base	338	184
697	1-1/2 HP Router/Shaper	418	235
698	Heavy Duty Shaper Table	238	135
352VS	3x21 v/s Belt Sander w/bag	321	175
9352VS	Above sander with case	Sale	189
360	3"x24" Belt Sander w/ bag	.397	214
360VS	360 Sander w/ variable speed	429	229
362	4"x24" Belt Sander w/ bag	.412	225
362VS	362 Sander w/ variable speed	446	239
9125	3-1/4" Planer Kit w/ case	250	145
505	1/2 sheet Pad Sander	249	139
330	Speed Block Sander 1/4 sheet	120	68
556	Biscuit joiner w/ 5556 fence	Sale	135
557	Plate Jointer with tilt fence. Includes 2" & 4" blades for use with standard & face frame plates	400	199
5563	Face frame plates for 557		7.99
7529	NEW 2 HP variable speed Plunge Router	415	215
97529	Above router with guide, dust collection, and case	480	249
7519	3-1/4 HP Router 2 Handle	469	268
7518	3-1/4 HP 5 speed Router	534	289
7539	3-1/4 HP v/sp Plunge Router	534	289
7310	5.6 amp Laminate Trimmer	.176	104
97310	Laminate Trimmer Kit comp	336	194
97311	NEW Laminate Trimmer Kit with underscribe base	390	205
7335	5" Random Orbit Sander	254	139
97355	7335 w/ case & dust pick-up	274	149
7336	6" Random Orbit Sander	259	145
97366	7336 w/ case & dust pick-up	284	159
332	Palm Grip Rndm Orb Sander	133	59
333	above sander with dust bag	148	65
333VS	Random Orbit Sander - variable speed	150	85
334	333 Sander with PSA pad	.148	65
335	Palmgrip Random Orbit Sander with dual flip pad	Sale	85
310	Production Lam. Trimmer	270	154
347K	7-1/4" "Framers" Circ Saw with plastic case	250	129
743K	7-1/4" "Framers" Circ Saw with case - left hand version	250	129
9737	Tiger Recipro Saw	307	159
9543	NEW Top Handle Jig Saw	300	165
97765	NEW SDS Rotary Hammer Drill	380	199

Porter Cable Bammer Nailers !

CDA250	Angle Finish Nailer 1-1/4" to 2-1/2"	500	279
CFN250	Finish Nailer 1" to 2-1/2"	500	279

Porter Cable Pneumatic Nailers

BN125	Brad Nailer -18 ga. 5/8"- 1-1/4"	144	89
BN200	Brad Nailer -18 ga. 3/4"-2"	238	128
FN250A	Finish Nailer -16 ga. 3/4"-2-1/2"	362	185
DA250A	Nailer -15 ga. 1-1/4"-2-1/2"	.412	215
FC350	Framing Nailer - c lipped head	558	289
FR350	Framing Nailer - r ound head	558	289
RN175	Roofi ng Coil Nailer	504	289

Porter Cable Compressors

CF1400	1 HP, 4 gal. Pancake	Sale	195
CF1540	1-1/2 HP, 4 gallon Side Stac k	Sale	305
CF2400	2 HP, 4 gal. Side Stac k	Sale	325
CF2020	2 HP, 20 gallon wheeled	Sale	425

Porter Cable Cordless Drills

9862	12V Drill Kit w/ 2 batteries	382	149
9862F	9862 Drill Kit with fl ashlight	Sale	159
9872	14.4V Drill Kit w/ 2 batteries	.424	185

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Asian longhorned beetles: A threat to our hardwoods

Early last February, Chicago city crews dropped, cut up, chipped, and burned the wood from hundreds of mature silver maple and horse chestnut trees in near-north neighborhoods. The massive cut was an attempt to stop the local spread of the Asian longhorned beetle, an imported pest that attacks hardwood trees. The first infestation, in New York in 1996, cost state and federal governments $4 million to control.

Hitchhikers through customs

According to the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS, 301/734-8295), the beetles—native to China, Japan, and Korea—hitchhike to the United States as larvae burrowed in pallets and crates made from untreated wood. (All those countries except China have long had a wood packaging fumigation law.) Stateside, the larvae hatch and the beetles emerge to seek hardwood trees as food and home for their eggs. The beetles prefer maples and horse chestnuts, but also attack yellow poplar, willow, elm, mulberry, black locust, and some commercial fruit trees.

"If left undetected, the beetle could spread coast to coast wreaking havoc on lumber, maple syrup, fruit, and tourism industries," says Rick McNaney, a public affairs officer with APHIS. "On that scale, eradication could cost billions of dollars."

The grown-up females (see photo *top right*) lay their eggs in the tree bark; then the resultant larvae bore large holes into the trunk and grow to adulthood. Later, when the adults chew their way out, they leave behind dime-size holes that disrupt the flow of sap and kill the tree, as in the photos *below left*.

The beetles quickly spread, too, attacking one tree to exhaust it as a food source, then moving to another. People also unintentionally help spread them by cutting infested trees and moving the wood from the area. Because of their preference for fresh food, sawn and dried lumber isn't on their menu. (The infested wood in imported crates and pallets was green when worked overseas.)

Local control: slash and burn

The beetles have no natural enemies here. And spraying won't help because they live inside the tree. So only the removal of affected trees and burning them can stop an infestation.

To combat the Asian longhorned beetle's spread, APHIS has heightened inspections in targeted areas (see map, *below*) as well as implemented regulations that require all solid wood packaging from Asia—principally China—be kiln-dried, fumigated, or treated with preservatives prior to shipping to the U.S.

American tool companies that import haven't experienced any extra costs associated with the new rule. Steve Erbach of Grizzly Machinery Company in Bellingham, Washington, says, "We insist that our sources comply with the packaging regulations, and they absorb the expense. But the wood packaging we receive is mostly plywood, which the beetles don't infest." Likewise, Cliff Rickmers, who deals with imports for Jet Machinery Company in Auburn, Washington, says added cost isn't a factor. "It costs about $65 to $100 to fumigate a whole [shipping] container over there, so it isn't passed on to us."

Asian longhorned beetles measure 1" long with antennae even longer.

Keep your eye out for beetles

Chicago's Asian longhorned beetle infestation was discovered and reported by a concerned citizen. You could help, too, by keeping your eye out for these telltale signs in the summer months when beetles get active:

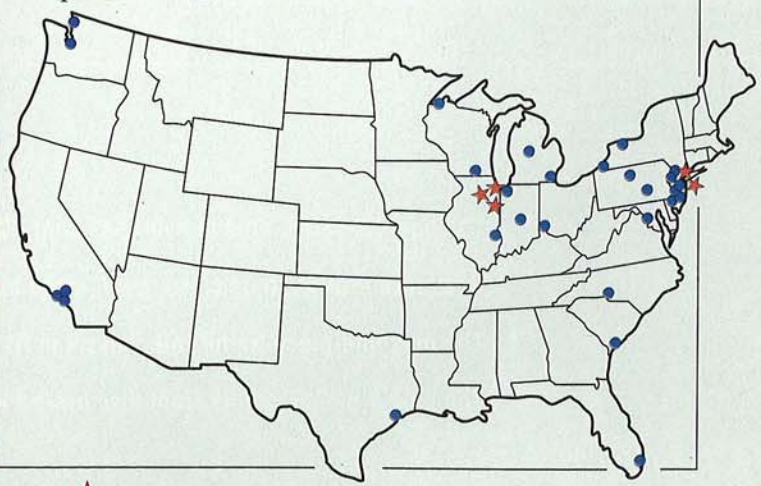
- Unseasonal drooping or yellowing of leaves on hardwoods when the weather has not been especially dry.
- Sap oozing from entry holes.
- Piles of fras (insect waste and sawdust) in tree crotches or at bases.

If you spot signs of beetles—even in one tree—contact your state or county agriculture office or city forester.

Photographs: Ken Law, courtesy USDA-APHIS
Illustration: Kim Downing

Adult Asian longhorned beetles chew their way out of trees, leaving dime-size holes.

Detections of Asian longhorned beetles (ALB) in import warehouses have been made in the areas *below* since 1996.



Introducing a truck so advanced, it's

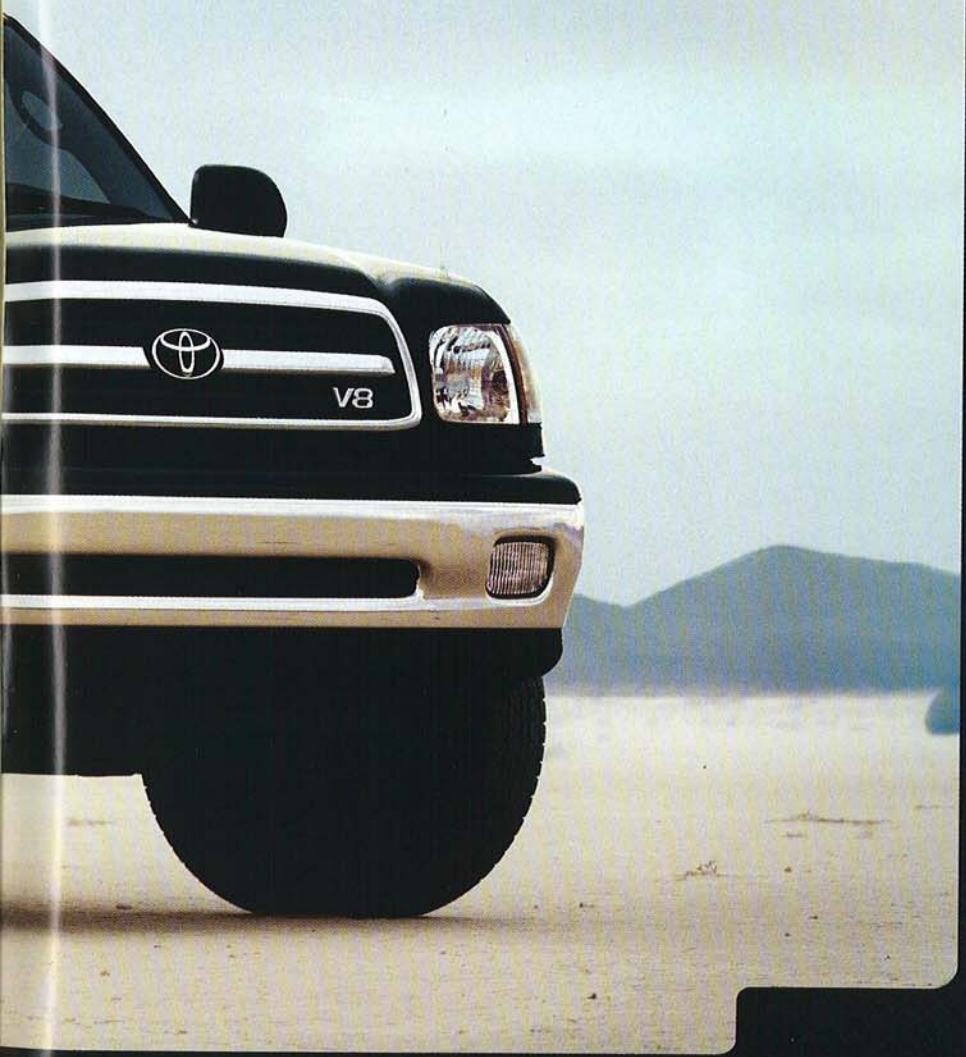
Starting at $15,428. Model shown is $24,928.[1]

Have we gone too far?

- The only 32-valve, double overhead cam V8 available in a full-size truck.
- Best acceleration in its class, even while towing.[2]
- The only one-piece frame rail chassis in its class.
- The only 4-piston caliper front disc brakes in its class.

TOYOTA TUNDRA

already best in its class.



In its class, the new full-size Tundra is amazing. Its advanced-design i-Force engine makes it the fastest.[2] Its frame is, hands down, the strongest.[2] And no other truck has Tundra's brakes or the stopping power that goes with them.[3] With its ability to tow up to 7,200 lbs. and handle up to 2,000 lbs. of available payload,[4] the Tundra is complete. There's a reason the new Tundra is the best in its class. We built it to be. To learn even more about the Tundra, call 1-800-GO-TOYOTA for your complimentary video.

Or have others not gone far enough?

www.toyota.com ✦ 1-800-GO-TOYOTA

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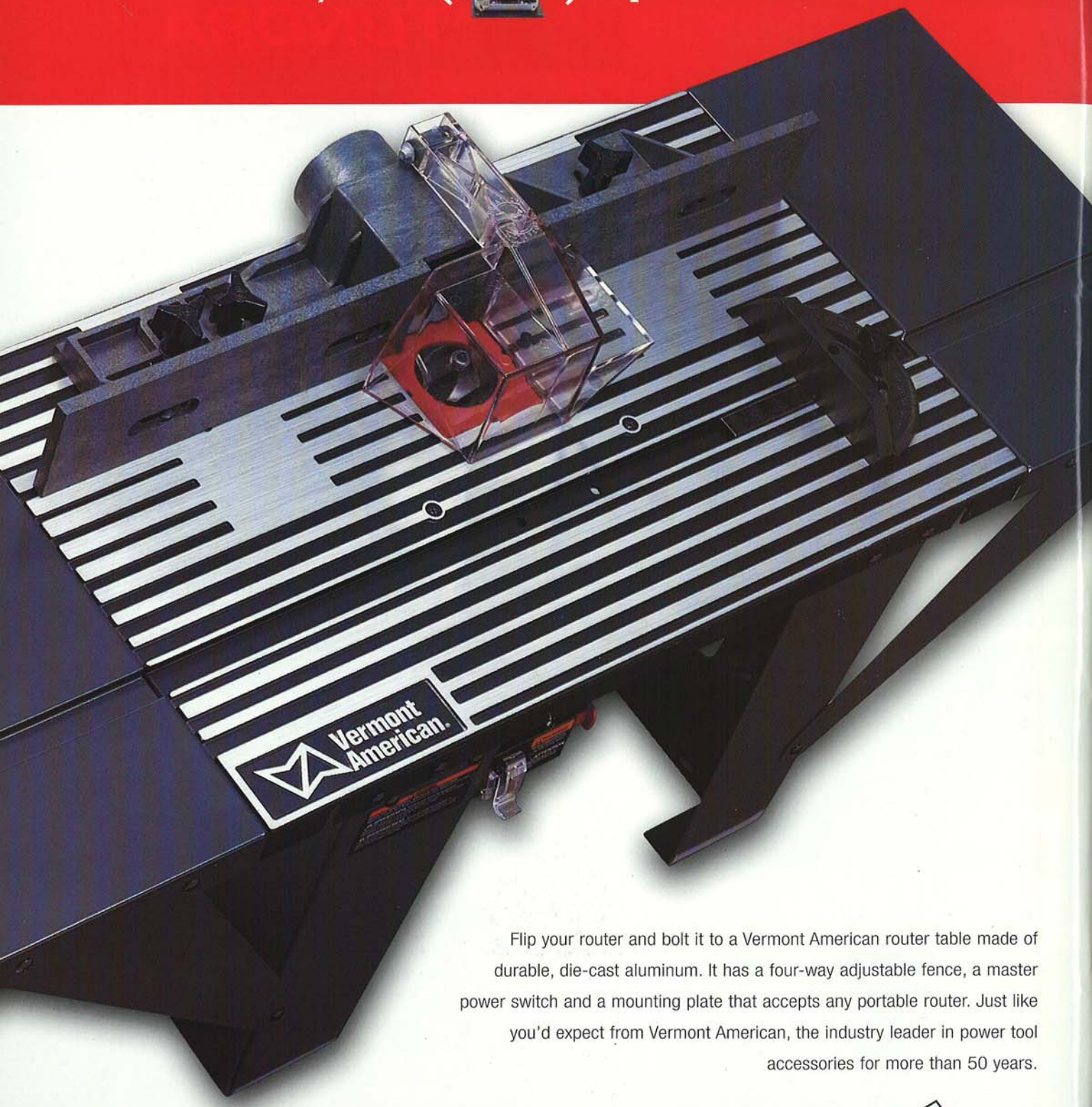
[1]Based on manufacturer's suggested retail price, including destination charge. Excludes taxes, license, title and other optional or regionally required equipment. Actual dealer price may vary. [2]Based on AMCI-certified performance tests conducted using a model-year 2000 Toyota Tundra 4x2 V8 Access Cab SR5 against comparably equipped 1999 4.6-liter Ford F-150, 4.8-liter Chevrolet Silverado and 5.2-liter Dodge Ram half-ton full-size 4x2 V8 pickup trucks. [3]Based on AMCI-certified performance tests conducted using a model-year 2000 Toyota Tundra 4x4 V8 Access Cab Limited against comparably equipped 1999 5.4-liter Ford F-150, 5.3-liter Chevrolet Silverado and 5.9-liter Dodge Ram half-ton full-size 4x4 V8 pickup trucks with 1,200 lbs. of payload. [4]On 4x2 Access Cab SR5 model with available Style Package only. Payload includes occupants, equipment and cargo.

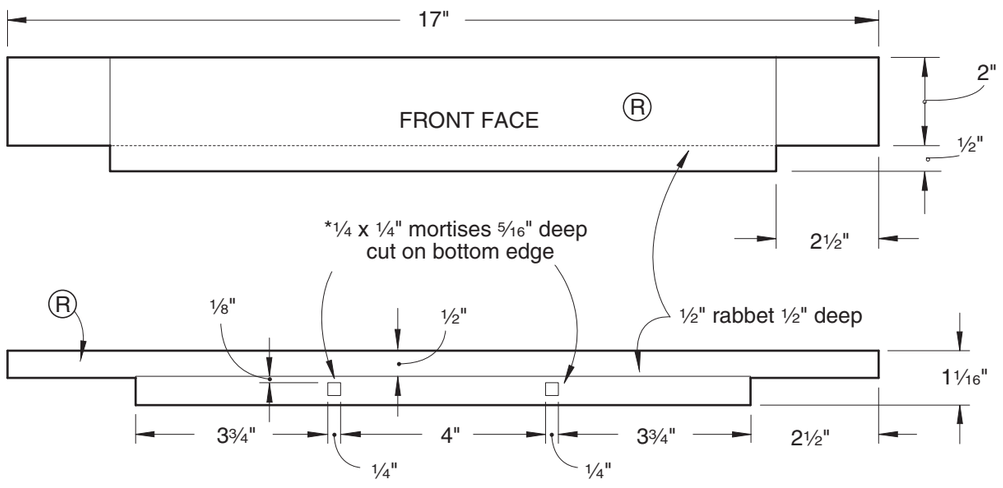
Turn your ( ) upside down.



Flip your router and bolt it to a Vermont American router table made of durable, die-cast aluminum. It has a four-way adjustable fence, a master power switch and a mounting plate that accepts any portable router. Just like you'd expect from Vermont American, the industry leader in power tool accessories for more than 50 years.

Vermont American®

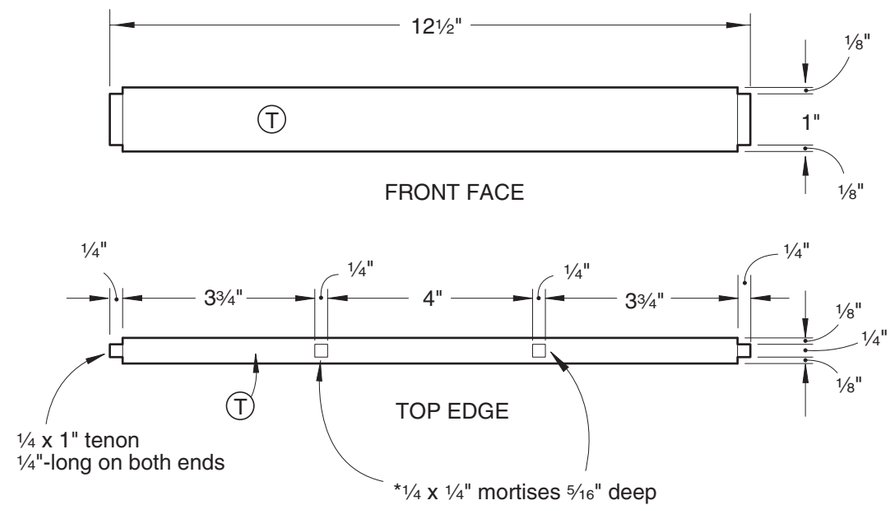
AMERICA'S #1 MANUFACTURER of power tool accessories™



BOTTOM EDGE

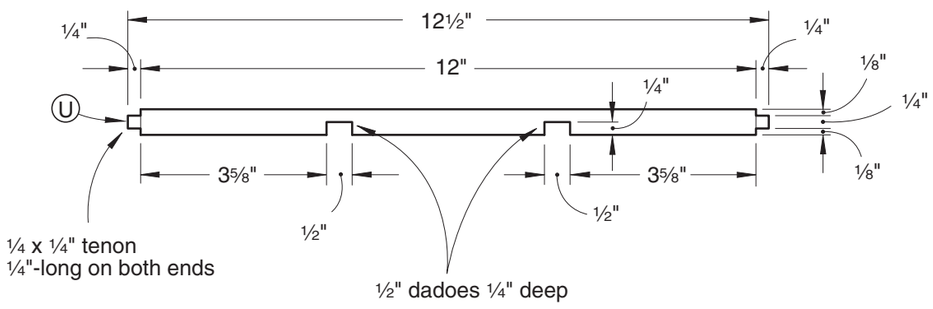
***Note:** Mortises on bottom edge of (R) are located the same as mortises on (T). These mortises are cut ⅛" from back edge of stock on (T) and ⅛" from edge of rabbet on bottom edge (R).

TOP DOOR RAIL



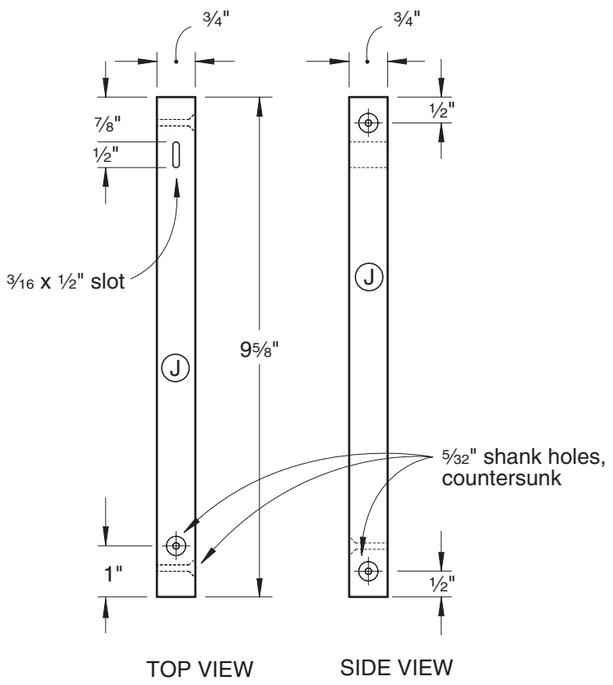
MULLION RAIL

HORIZONTAL MULLIONS



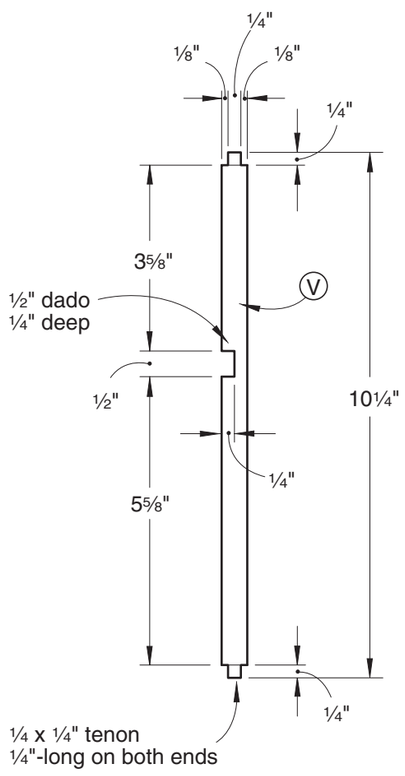
FRONT FACE

PARTS VIEW



TOP VIEW SIDE VIEW

CLEATS



VERTICAL MULLIONS

Better Homes and Gardens® WOOD® PATTERNS®

For your woodworking convenience

AUGUST 1999 **ISSUE 116**

Dear Reader: As a service to you, we've included full-size patterns on this insert for irregular-shaped and intricate project parts. You can machine all other project parts using the Bill of Materials and the drawings accompanying the project you're building.

Arts-and-Crafts Bookcase
Cool Casserole Carrier
Lazy Susan

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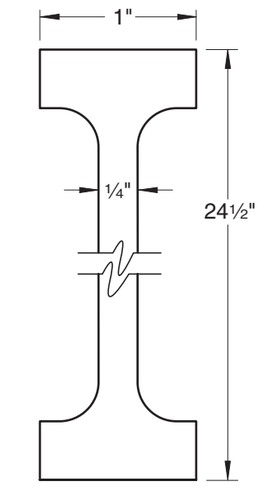
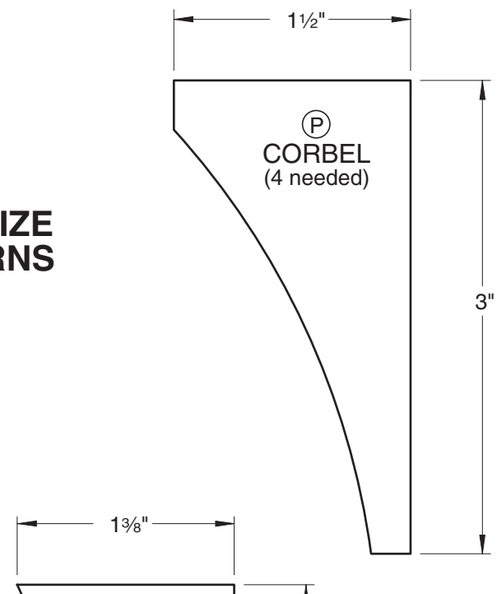


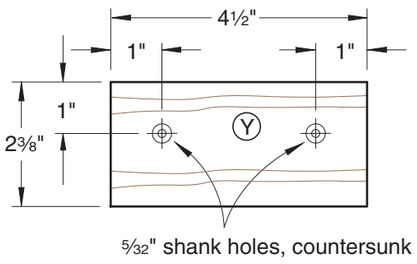
SIDE PANEL CUTOUT

FULL-SIZE PATTERNS

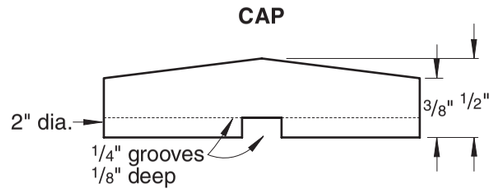


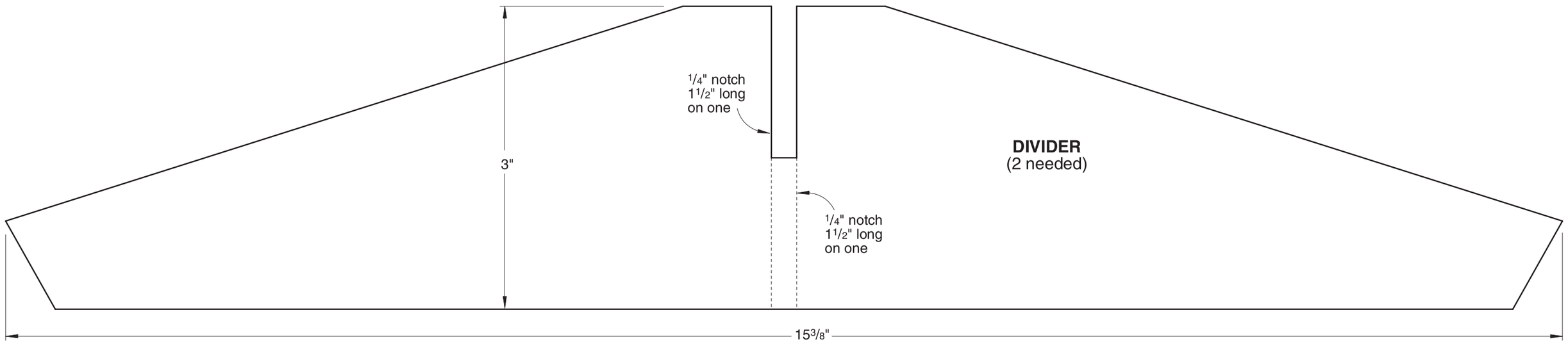
ARTS-AND-CRAFTS BOOKCASE FULL-SIZE PATTERNS AND PARTS VIEW DRAWINGS

See page 62

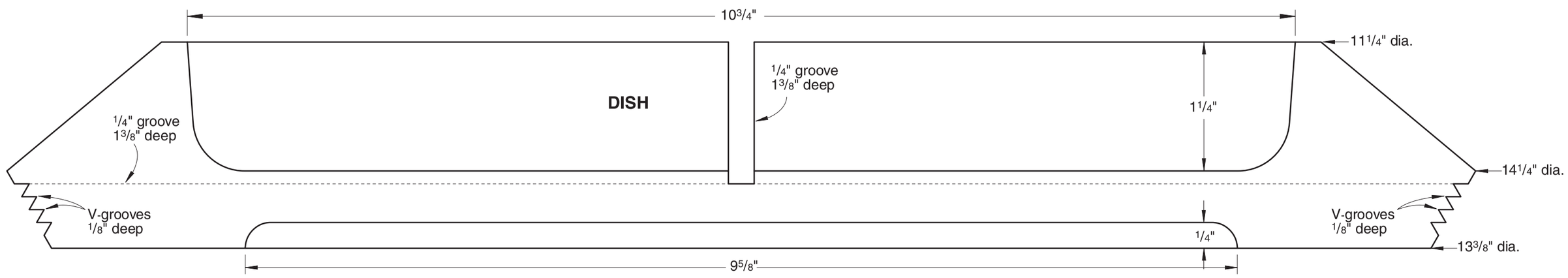


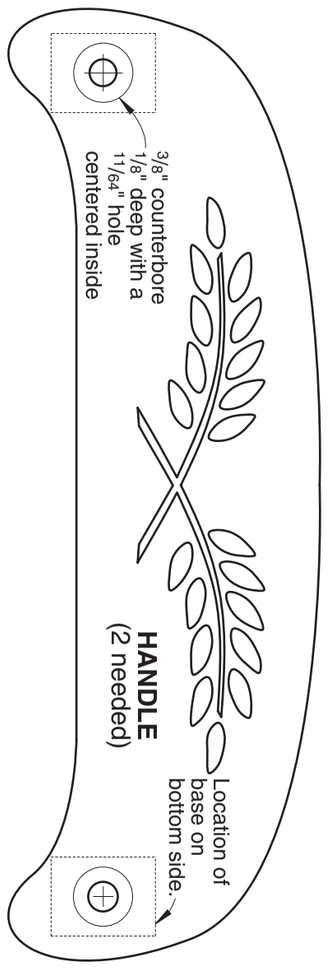
DOOR STOP
(not full size)

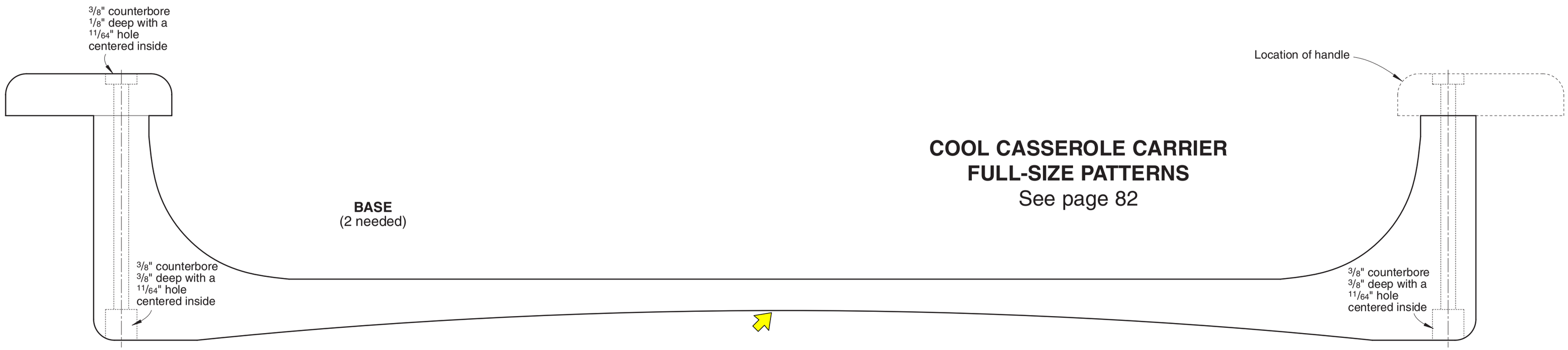




LAZY SUSAN
FULL-SIZE PATTERNS
See page 84







COOL CASSEROLE CARRIER
FULL-SIZE PATTERNS
See page 82